Natural Environment Research Council

ARASF

Atmospheric Research Airborne Support Facility

Flight Data Catalogue

Flight A533

5 April 1997

OXICOA

FLIGHT FOLDER

Flight No. A 533

DATE: 05/04/97

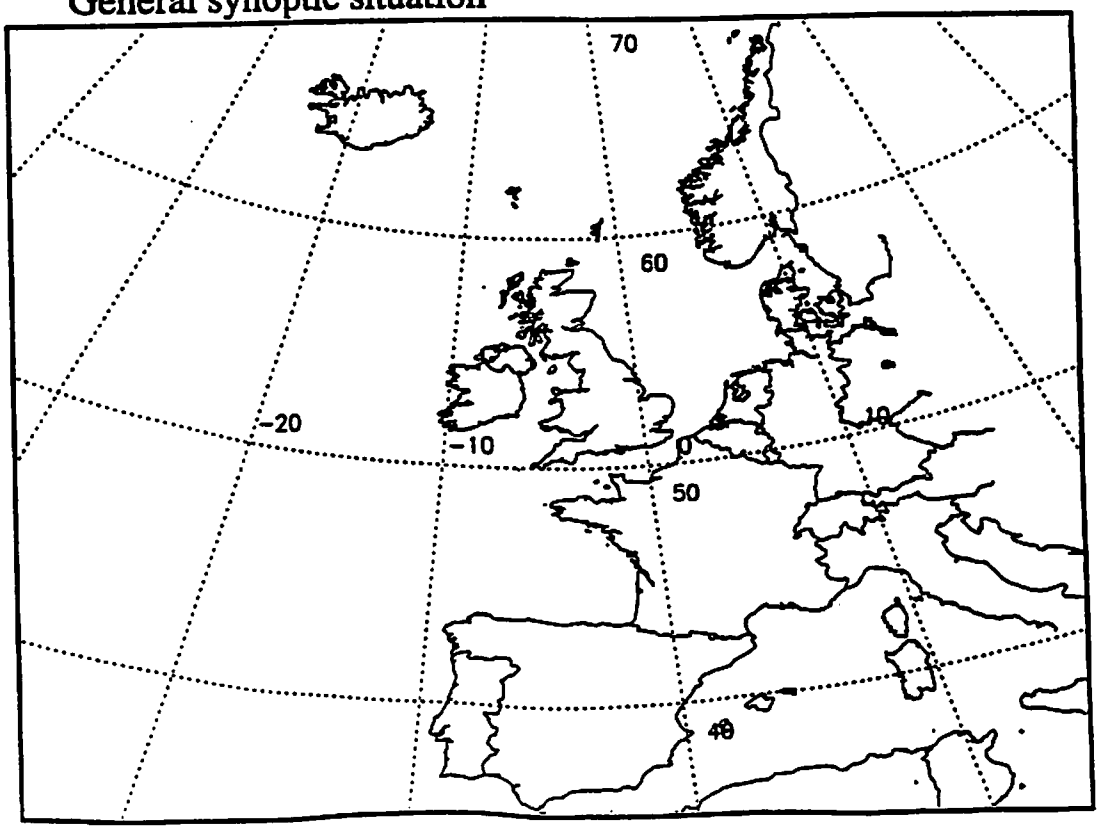
Take off : 0810
Landing : 1510

Aircraft Scientist : KATE, RICHER
Flight Leader : PERCIVAL
Others : DEWEY, KENT, TIDDEMAN, BANDY, BAUGUITTE, GIDDINGS, MILLS, PENNETT, LAW, PICHERING, PURSE, GREEN, LANGRIDGE, BOYD.

Captain : SQN LDR O'BRIEN
Co-pilot : FLT LT THORNHILL
Navigator : FLT LT CANNING
Engineer : SGT LENNARDS
Loadmaster : M.ENG QUICK
FLT LT PURSE
FLT LT MORRISS

Trials Instructions TACIA :
Operating area : PRESTWICK TO SANTA MARIA, AZORES.

General synoptic situation

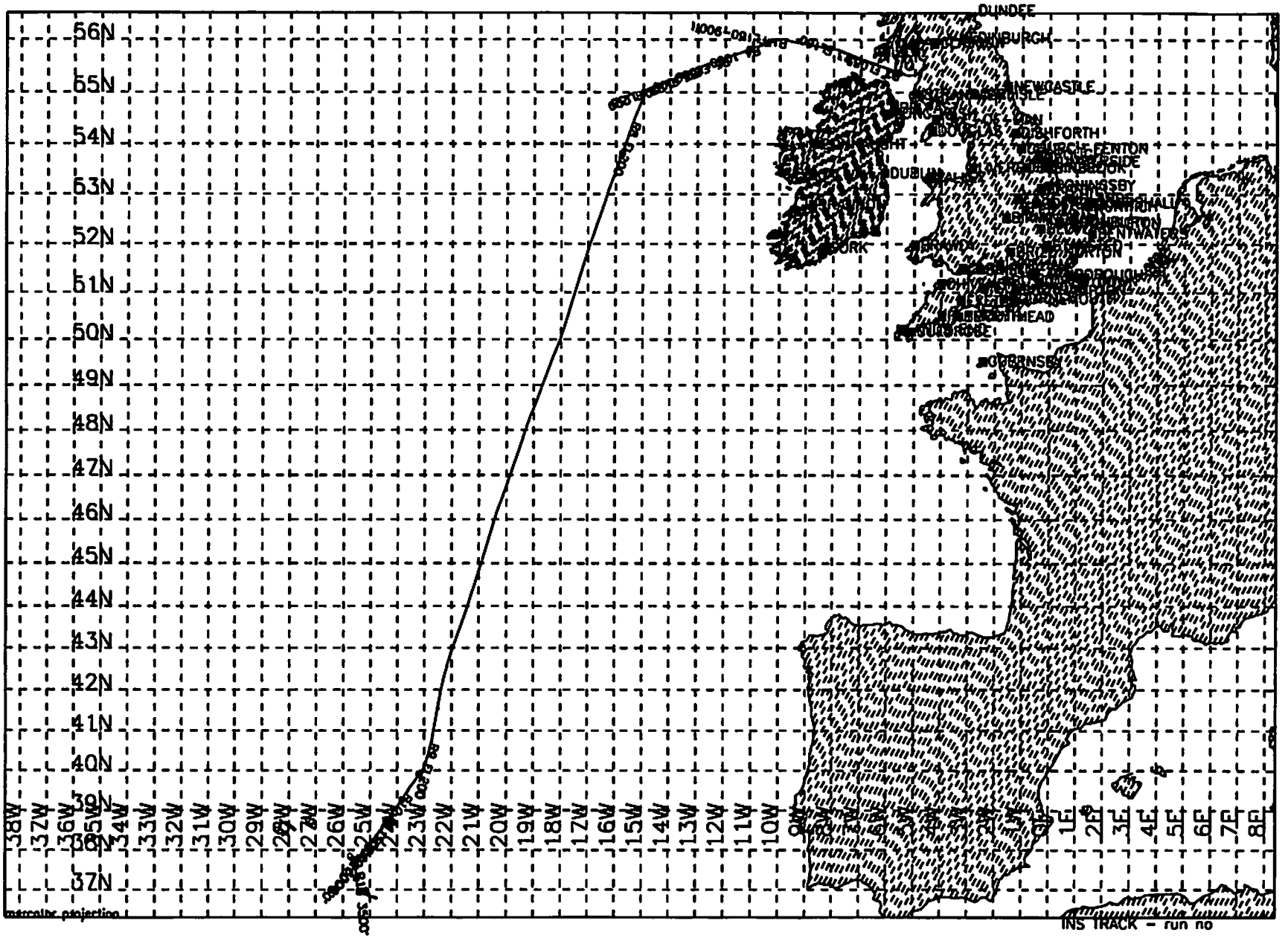


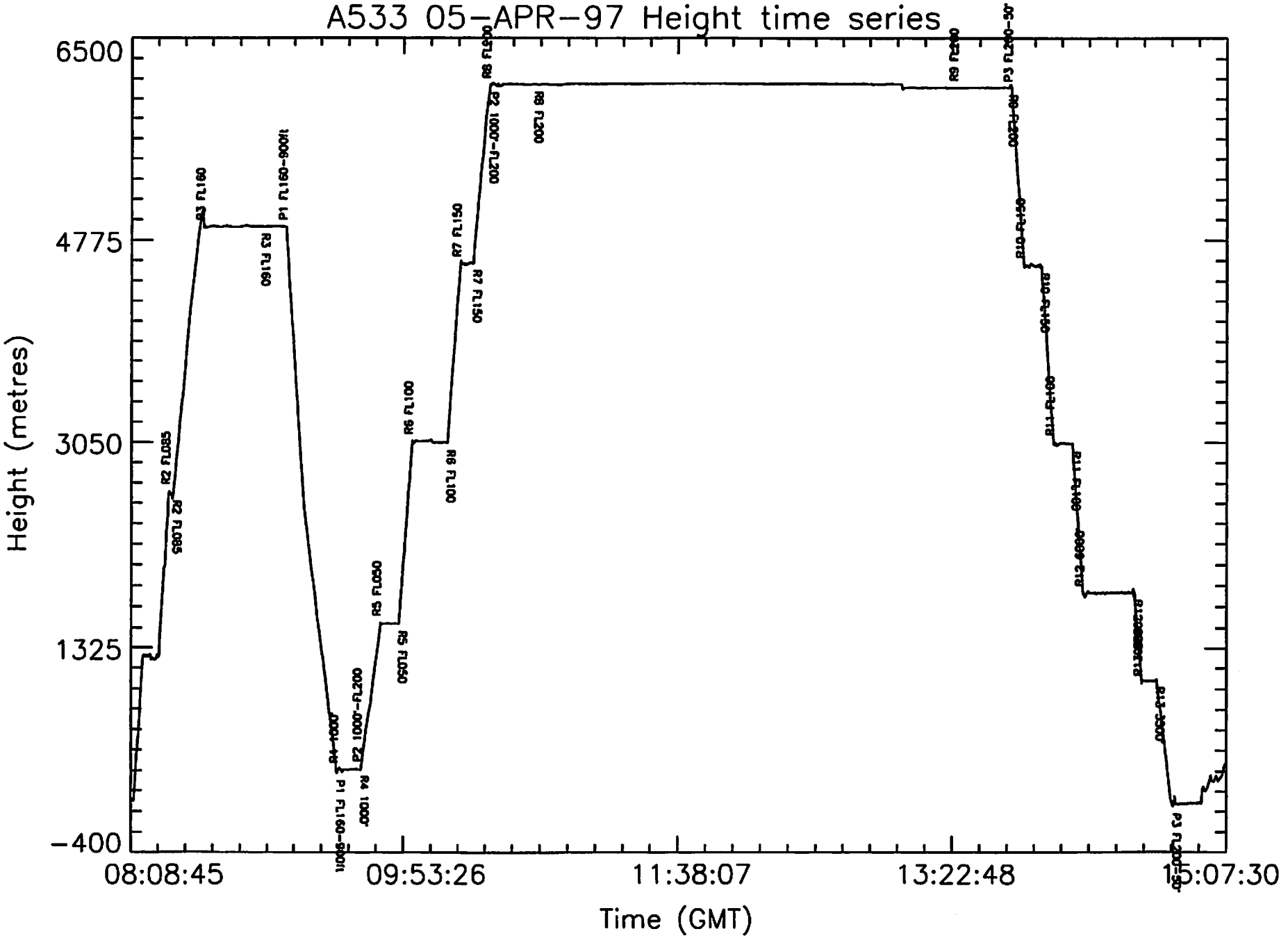
TIME :

A533, 5th April, 1997
ACSOE
Prestwick to Santa Maria.

Start time	End time	Event	Height(s)	Hdg	Comments
080845					Take off from Preswick
081412	081917	R1	4000'	280°	Instrument warm up run
082330	082503	R2	FL085	300°	Cloud Free Run
083649	085854	R3	FL160	290°	
090826	092800	P1	FL160- 900ft	270°	1000fpm,500fpm from 8000'
092818	093717	R4	1000'	270°	
093717	094444	P2.1	1000'- FL050	270°	500fpm
094444	095152	R5	FL050	270°	
095152	095650	P2.2	FL050- FL100	270°	1000fpm
095650	100348	R6.1	FL100	270°	
100348	101012	R6.2	FL100	270°	
101012	101513	P2.3	FL100- FL150	265°	1000fpm
101513	102012	R7	FL150	265°	
102012	102627	P2.4	FL150- FL200	220°	1000fpm
102627	104337	R8	FL200	225°	Accelerate to 220kts
132441	134433	R9	FL200	220°	230kts IAS
134523	135006	P3.1	FL200- FL150	225°	1000fpm 180kts IAS
135006	135646	R10	FL150	225°	
135646	140135	P3.2	FL150- FL100	230°	1000fpm
140135	140851	R11	FL100	225°	
140851	141259	P3.3	FL100- 6000'	230°	1000fpm
141259	143231	R12	6000'	235°	
143231	143519	P3.4	6000'- 3500'	180°	1000fpm
143519	144055	R13	3500'	180°	
144055	144717	P3.5	3500'- 50 ft	180°	500fpm
144822	145804	R14	100'	110°	Artifact run.
150730					Land at Santa Maria. 36°58.30'N 025°09.85'W

A533 05-APR-97 08:08:45-15:07:30GMT




A533 05-APR-97 Height time series
6500
4775
3050
1325
-400
Height (metres)
08:08:45
09:53:26
11:38:07
13:22:48
15:07:30
Time (GMT)

AIRCRAFT SCIENTIST'S LOG

Project: ~~ASSB~~ACSOE **Date:** 5/4/97

Aircraft Scientist: A. Kaye. **Flight No:** A533 **Page** 1 **of** 4

GMT	Event Mark	Run No.	Height Pres/Rad FL		INS	Omega Latitude / Longitude	Other Info. (eg: clouds, weather, visibility, winds, sea state etc.)
08:14:12	11	R1	4000	P	274	55.33 / -5.15	in solid cloud layer. —— 4K not 3K for safety/weight.
08:19:17	12	R1e	4000	P	.		in cloud. climbing to FO60.
08:23:29	13	R2	085	F	291	.	Run aborted because of cloud.
08:25:03	14	R2e					Climbing to get clear of cloud. Captain estimates about 15K
08:36:49	15	R3	160	F	295	55.54 / -6.41	Ci above 8/8 sc below very thick layer of cloud Now noted wind dropped significantly in climb and changed Direction Frontal layer?
08:50:41	.	R3	160	F	291	55.75 / -7.56	
							Ci above breaking up ahead. Solid sc. below.
08:54:25		R3	160 ~~250~~	F	291	55.81 / -7.86	4/8 ci above solid s.c. below Jet con trail visible above trail evaporating quickly.
08:58:54	16	R3e	160	F	283	55.84 / -8.21	Ci breaking up overhead solid sc. below.
9:05:45		.	160	F	282	55.89 / -8.78	jet con trail overhead evaporating very quickly. thin ci Solid sc below
9:08:24	17	P1	160	F	282	55.92 / -9.00	.
9:15:34			8000	P	283	55.97 / -9.53	Ci Altocu above sc below. rate of decent at 800 ft/min
9:25:08		P1	2500	P	259	55.97 / -10.32	in cloud.

AIRCRAFT SCIENTIST'S LOG

Project: ACSoE **Date:** 5/4/97

Aircraft Scientist: A. Kaye. **Flight No:** A533 **Page** 2 **of** 4

GMT	Event Mark	Run No.	Height Pres/Rad / FL		INS	Omega Latitude / Longitude	Other Info. (eg: clouds, weather, visibility, winds, sea state etc.)
..	19	P1c	900	P			
9:28:19	20	R4	1000	P	259	55.92 / -10.55	in cloud S. Penleat. decision made not to ~~de~~ descend to 50' because of cloud
9:37:26	21	R4/P2.1	1000	P	259	55.02 / -11.18	in cloud.
9:42:45			3800	P			precipitation — window.
9:44:48	22	P2.1 R5	050	F	262	55.72 / -11.78	out of cloud 8/8 sc below alto cu above.
9:51:52	23	R5/P2.2	050	F	258	55.62 / -12.25	Precipe on window solid cloud above and below in a thin veil of cloud.
9:56:21	.				.	55.56 / -12.54	cloud top ~~9[illegible]~~ FL091
9:56.51	24	P2.2/R6.1	100	F	260	55.55 / -12.61	Zero runs started.
10:03:46	25	R6.1/R6.2	100	F	255	55.42 / -13.23	IN cloud.
10:10:13	26	R6.4/P2.3	100	F	249	55.30 / -13.72	in cloud in and out of cloud as climb.
10:15:14	27	P2.3/R7	150	F	255	55.20 / -14.13	in cloud... ~~[illegible]~~ with bright flashes so we must be near the top.
10:17.38	:					55.15 / -14.38	out of cloud * cloud top ~~[illegible]~~ away.
10:20:15	28	R7/P2.4	150	F	251	55.11 / -14.50	small wisps of cu above 8/8 sc below NO Ci above.

AIRCRAFT SCIENTIST'S LOG

Project: ACSoE **Date:** 5/4/97

Aircraft Scientist: A. Kaye **Flight No:** A533

GMT	Event Mark	Run No.	Height Pres/Rad FL		INS	Omega Latitude Longitude	Other Info. (eg: clouds, weather, visibility, winds, sea state etc.)
10:26:29	29	2.4/R8	200	F	209	54.99 -15.02	clear above 8/8 Sc below. Several layer vis Below.
10:43:30	30	R8e	200	F	211	53.79 -15.81	end of run 8/8 Sc below, clear above.
13:24:41	31	R9	200	F	188	41.44 -22.56	Start of NOXY Calibration Run clear above
							Some ci visible in the distance solid sc below.
13:38:05		R9	200	F	195	40.36 -22.80	clear above solid sc. Below.
13:49:33	32	R9e	200	F	~~195~~ 215	39.05 -23.25	end of R9 High Speed runs.
13:45:25	33	P3.1	200	F	216	39.79 -23.31	7/8 Sc below some gaps.
13:50:06	34	P3.1 R10	150	F	217	39.56 -23.55	Some streets visible in the SCs below.
13:56:47	35	R10/P3.2	150	F	216	39.24 -23.07	7/8 sc below. clear above.
14:01:35	36	P3.2/R11	100	F	218	39.02 -24.08	8/8 sc below clear above.
14:08:58	37	R11/P3.3	100	F	213	38.66 -24.45	hazy ahead 8/8 sc below.
14:13:00	38	P3.3/R12	6000	P	213	38.47 -24.63	sc below clear above 20 minute run last 15 min long cal for Peroe & Hcho
14:19:10	39		6000	P	219	38.33 -24.00	8/8 sc below sea visible through gaps.

AIRCRAFT SCIENTIST'S LOG

Project: ACSOE **Date:** 5/14/97

Aircraft Scientist: A. Kaye. **Flight No:** A533 **Page** 4 **of** 4

GMT	Event Mark	Run No.	Height Pres/Rad FL		INS	Omega Latitude / Longitude	Other Info. (eg: clouds, weather, visibility, winds, sea state etc.)
14:24:44		R 12	6000	P	219	37.98 / -25.21	mountains of Ponta del Ruanda visible through clouds.
14:32:32	40	R12/P3.4	6000	P	160	37.67 / -25.59	clear air sea calm no white caps
13:35:22		R13	3500	P	168	37.51 / -25.55	Sc ahead clear above & below & white caps visible.
14:40:56	42	R13/P3.4	3500	P	168	37.21 / -25.53	No ci solid s.c. 3000 cloud top. 2000ft cloud base
14:44:45			3300	P	157	37.06 / -25.49	hazy some white caps visible.
14:45:17	43	P3.4c	50	R	159	36.96 / -25.46	1016 Sea state 4
14:48:23	45	R14	100	R	93	36.96 / -25.38	hazy under Sc.
14:53:05	46	R14c	100	R	102	36.79 / -24.95	" "
							end of Science.

OXICOA: Air Mass Characterization Transit

SORTIE OBJECTIVE:

To observe the transition inatmospheric chemical composition across the polar front. The data will be added to a systematically collected airmass data base. The data base will be used to determine the oxidising capacity and the budget of tropospheric oxidants in marine air at mid latitudes in the northern hemisphere..

LOCATION: North Atlantic Ocean

WEATHER: Cloud Free

FLIGHT PATTERN:

[1] Depart Prestwick and transit to sampling area at convenient altitude.

[1.1] Hold climb at ~~3~~000 ft for wet chemistry check.

[1.2] 15 minute run (above boundary layer, speed 180 kts.) for NOxy Calibration.

[2] Stepped profile ascent from 50ft (or minimum safe altitude) to approx. FL200 — 500ft/min below approx. FL70, 1000ft/min above.

[2.1] Interrupt profile to fill bottles and/or bags (≈ 8 min) at:

1 bag + 1 bottle at each level.

100', 3000' ~~FL060~~ FL050, FL 100, FL 150, FL 200.

[3] Transit to Santa Maria ATC (or until good radio contact established with Santa Maria) at ~~FL150 and 180 kts.~~ FL200 1 bag every 15min.

[4] Stepped profile descent from approx. FL200 to 50ft (or minimum safe altitude) — 1000ft/min until approx. FL70 then 500ft/min.

[4.1] Interrupt profile to fill bottles and/or bags (≈ 8 min) at:

1 bag + 1 bottle at each level

FL 200, FL 150, FL 100, FL 60, ~~FL~~ 3000', 100'.

[5] Transit to Santa Maria as convenient.

~~[5.1] 15 minute run (above boundary layer, speed 180 kts) for NOxy Calibration.~~

10 minutes — before Final approach

OTHER REQUIREMENTS:

Cabin pressure and temperature to be kept constant on level runs.

MISSION SCIENTIST'S LOG

Project: OXICCA **Date:** 5/4/97

Mission Scientist: S. Penkett / K. Law

Flight No: A533 **Page** 1 **of** 2

GMT	Run No.		Notes:
08:14 12	R1	05?	50ppbv O3, ~0.2ppbv H_2O_2
	R2	085	Aborted for NO_{xy}
	P3	085 – 15	Generally good H_2O_2 : O3
	R3	016	correlation in "profile" (from ground)
		→ 0220?	But XY plot flat (no H_2O_2 lag)
			Duelty (constant org. peroxide
			~0.1ppbv.
			O3 incr at cont FL by 5ppbv.
			Top of profile O3 – 58.94 ppbv
090826	P1	FL160 → FL10	[Runs at 10, ~~30~~ ~~50~~ 100 150 200]
			3 Lay O3 layer at ~~3~~ 4km
	R4		Straight down – no steps / Cottles
09.28.03	R5	FL10 (7-8 mins)	Very low H_2O_2 in MBL (0.1 ppbv)
			Others: ~~strato~~ ~~structure~~ ~~FL~~ uniform PBL
09.37.26	P2.1 ↑	FL10 → FL50	HCHO – difficult to see – offset
			est: 500–600 ppbv range
09.44.44	R5	FL50	Higher H_2O_2 alone
09 51 52	P2.2	FL050 → FL100	profile ↑ slightly warmer
			(land top 8000ft
09 56 50	R6.1	FL100	zero'ing
10.03.48	6.2		→ still uniform – org peroxide ~0.1 ppbv
10.10.12	P3 ↑	FL100 → FL150	Continuing profile, slightly less H_2O_2
10.15.13	R7	FL150	(θ = 58°)
10.30.12	P4 2.4	FL150 → FL200	Next leg (turning south)
			spike in O3 at 6000m (20,000ft)
	R8	FL200	printed O3/H_2O_2 at 10.31.14
			Looking at O3 : H_2O_2 10.30 → 10.40
			there was a layer 5-6km (calc Z) where
			there is anti-correlation
			NO_{y2} ~0.2 → 400ppbv. – levelling max
			NO_2 → 100–200pptv.
11.49			Feature in NO_2, NO_y, O3, H_2CO
			– all incr followed by smaller

Atmospheric Research Airborne Support Facility **NERC Scientific Services**

S.F. 1ppbv – NO_y
250 NO_2
150 NO

MISSION SCIENTIST'S LOG

Project: OXICOA **Date:** 5 14 97

Mission Scientist: S. Penkett, K. Law **Flight No:** A533 **Page 2 of 2**

GMT	Run No.	FL 150, 100, 60, 30, 10	Notes:
13.45.31	P3.1↓	FL200→	41°N, 24°W (approx.)
			O_3 levels at 50-60 ppbv.
13.50.06	R10		large inc in H_2O_2.
	P3.2		
	R11	FL~~100~~ 100	H_2O_2 starting to incr around
			12000 ft
	P3.3		
14:09	R12	FL~~100~~ 60	O_3 incr, NOy ↓ with altitude
			H_2O_2 correlating with O_3
			mod H_2O_2 diverging by more than
			further reach (now 2.5 ppbv).
			Mean H_2O_2 up to 1.5 ppbv (3x > than 5500 ft)
			mod H_2O_2 up to 4.5 ppbv.
14.13.19	P3.4	FL60 → FL3	Now O_3 is uniform around 50 ppbv.
			one layer (14.35) → 600 ppbv NOy (approx)
	R13	FL35	70 ppbv O_3.
			~400 ppbv NO_2 (approx conv!)
14.1'	P3.5	FL35 → FL10	
14.48.22	R14	FL100	
14.58.04	finish		

POST FLIGHT REQUIREMENTS FORM

Flight No: 533 Date: 05.04 97 A/S Name: AKAYE

Aircraft Scientist's Post Flight Requirements:

1. Are any copies of the flight folder required?
   YES ☑ NO ☐ for .....5.....

2. Flight data and folders will normally be discarded after 10 years, is this OK?
   YES ☑ NO ☐ If not OK, state period .....

3. Is the flight part of an international project or major campaign?
   YES ☐ NO ☐ Name of Project .....ACSOE.....

4. Do you want the video tape kept?
   YES ☑ NO ☐ How long? .....10 YRS.....

5. Has the Handheld camera or the Camcorder been used:
   YES ☐ NO ☑
   If yes, do you want the handheld camera film processed:
   immediately ☐ or when the film is finished? ☐

6. Do you want the cloud physics data kept?
   YES ☐ NO ☐
   If yes, which disc / file do you want it stored in?.....

7. Do you want to do the interactive processing?
   YES ☐ NO ☑

NOTE:

- Members of MRF Radiation and Cloud Physics groups are expected to meet their own requirements for data storage and non-standard processing.
- For non MRF users, Data Management Section will keep the processed data TEMPORARILY until the requirements are made known.
- Any other requirements for post-flight processing and data storage should be discussed with the Data Management Section.
- If copies of the Flight Folder are required, it is the responsibility of the Aircraft Scientist / User to produce them.

Interactive Processing Log

Flight No. A533 Date: 0504 97 User: KATE/NERC
Interactive by: D PERCIVAL
Date: 15 04 97

Renav

Kalman Filtering Applied

TWC

Profile plotted :
Line chosen : Profile / Whole flight / Other

a = − 0.5048 E 01
b = + 0.4123 E -2
c = + 0.1561 E -6

ok

LWC

ok

Heimann / ~~Barnes~~

ok

Flight Leader's Pre/In-Flight Check List

Flight No: A533 Date: 05 04 97 Page 1 of 3

CHEK for auto selection

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
0641	REF +	5	0567	✓		Approx 0568
	REF -	7	2854	✓		Approx 2858
	AOSS	19	0000	F/S O/S	TORQUE 3.5	 2047 st. and level
	AOA	18	0643	F/S O/S	TORQUE 3.5	 2047 st. and level
	RD HT	37	0000			As Indicated | 0000
	PR HT	8	3888	1010	1010 ✓	As Altimeter
	CABP	14	3312	1005		
	A/S	9	0083	✓		As ASI | 0000 – 0100
	UP1S	81	0206	20	21	
	UP2S	82	0192	9	10	
3NO2	UIRS	83	0020	-340	1558	
	UP1Z	84	0151	✓		Approx 0147
	UP2Z	85	0145	✓		Approx 0149
	UIRZ	86	0024	3NO2.		Approx 2061
	UP1T	87	2652	9	10.5	As IAT
	UP2T	88	2672	10		As IAT
	UIRT	89	0000	3NO2		As IAT
	LP1S	91	120	3	-13	Spiking !
	LP2S	92	0014	-50	-34	See pentcart !
	LIRS	93	0002	3NO2		
	LP1Z	94	0150	✓		Approx 0150
	LP2Z	95	140/263	✓	SPIKING	Approx 0146
	LIRZ	96	0001	3NO2	"	Approx 2050
	LP1T	97	2804	3	11.1	As IAT
	LP2T	98	2757	5	"	As IAT
	LIRT	99	1210	3NO2	"	As IAT
	J/W	42	0947	-0.1		As Indicated | 0000
	HYGR	58	2713	8.2	8.6	
	HYCC	59	0708	✓		696–901
	FDEW	138	4095			DP = (DRSU/20)-100 C
	FSTA	139	4095			
	DTF	10	2847	9.5	9.6	
	DTC	11	5			
	NDTF	23	2506	10	9.6	same as De-Iced
	NDTC	24	5			
	INCT	48	2819			
	HEIM	141	2408			
	PRTC	142	2379	✓		approx 2380
	TWCD	70	3904			0000–4094
	TSAM	72	0041	✓		0640–1860 | < *min*
	O3	100	0154			
	O3P	106	2041	961.4	-	P≃ (*DRSU* x 0.4) + 145*mB*
	O3RG	113	1516			
0702						

Flight Leaders' Pre/Post-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
0703	FL NO	1	Hex	0533	A533	OK	Flight No.
	GMTH	2	Hex	0070	070349		Clock: First 4 No.s
	GMTM	3	Hex	0349		/	Clock: Last 4 No.s
	E/M	4	Hex	07-9	/		Event Mark Counter
	INCH	49	Dec	'			Multipxd Hkeeping
3226 10-6	1452 / 3855	3222	0811	3226	3735	3226	0141
	LATC	160	Dec	0586	51.56	✓ ?	Latitude
	LONC	161	Dec	4043	-4.216	/	Longitude
0706							

RESET.

Total Water Content Meter Check List

TOTW for auto selection PRE FLIGHT Height:

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
0706	TWCD	70	4051	—		0001–4095
	TNOS	71	963	/		2000–3460 | *< min*
	TSAM	72	0043	/		0640–1860 | *< min*
	TAMB	73	2300	-Low?		2400–3200
	TSRC	74	2237	/		2160–2470
	HTR1	75	2079	/		0000–4095 | < 4095
	HTR2	76	2119	/		0000–4095 | < 4095
	ISRC	77	1022	/		0001–1230 | *< min*
	STAT	78	4038			4095 |
	EV1V	170	2043			
	EV2V	171	2043			
	NPWR	172	3486			
	EVIC	173	3968			
07	EV2C	174	3968			

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon JN 07	Off / On	Large/Small
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon JN 07	Off / On	

Flight Leader's ~~Pre~~/In-Flight Check List

Flight No: A533 Date: 050497 Page 2 of 3

CHEK for auto selection

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
0827	REF +	5	0567	/		Approx 0568
	REF -	7	2854	/		Approx 2858
	AOSS	19	1941	F/S / O/S	TORQUE	2047 st. and level
	AOA	18	0969	F/S / O/S	TORQUE	2047 st. and level
	RD HT	37	4095	FL130		As Indicated | 0000
	PR HT	8	2377	13.3	FL135 /	As Altimeter
	CABP	14	3253	980		
	A/S	9	1191	170	/	As ASI |0000 – 0100
	UP1S	81	0975	390	320	
	UP2S	82	6980	111	107	
	UIRS	83	607	-282	1558 3NO2	
	UP1Z	84	156	/		Approx 0147
	UP2Z	85	151	/		Approx 0149
	UIRZ	86	667	/	3NO2	Approx 2061
	UP1T	87	3023	-8	-9.5	As IAT
	UP2T	88	3023	-8		As IAT
	UIRT	89	0000		3NO2	As IAT
	LP1S	91	1280	7123	249	SPIKING
	LP2S	92	956	193	94	"
	LIRS	93	0900	-231	112 3NO2	
	LP1Z	94	3019	x SPIKING		Approx 0150
	LP2Z	95	624	x "		Approx 0146
	LIRZ	96	1525	x	3NO2	Approx 2050
	LP1T	97	3350	-22	-X	As IAT
	LP2T	98	3349	-22		As IAT
	LIRT	99	0871	97	3NO2	As IAT
	J/W	42	1190	0.1	0.04	As Indicated | 0000
	HYGR	58	1733	-23	-23.7	
	HYCC	59	0752	/		696–901
	FDEW	138	1323	-37.8		DP = (DRSU/20)-100 C
	FSTA	139	977			
	DTF	10	2238	-9		
	DTC	11	14		-8.2	
	NDTF	23	1988	-8		same as De-Iced
	NDTC	24	4			
	INCT	48	2686			
	HEIM	141	1383			
	PRTC	142	2378	/		approx 2380
	TWCD	70	1150			0000–4094
	TSAM	72	1083			0640–1860 | < *min*
	O3	100	0215			
	O3P	106	1884	900.6		P≃ (*DRSU* × 0.4) + 145*mB*
	O3RG	113	1741			
0856						

197
1001
449

Flight Leaders' ~~Pre~~/In-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
0404	FL NO	1	Hex	0533	A533	✓	Flight No.
	GMTH	2	Hex	0090	✓		Clock: First 4 No.s
	GMTM	3	Hex	0445	✓	090445	Clock: Last 4 No.s
	E/M	4	Hex	0016	✓		Event Mark Counter
	INCH	49	Dec				Multipxd Hkeeping
2358 -11.05	3254 ✓ / 1284 ✓	2360 ✓	1452	2357	3792 ✓	2360 ✓	0173 ✓
	LATC	160	Dec	0636	55.968 N	✓	Latitude
	LONC	161	Dec	3993	-8.616	✓	Longitude
0410							

Total Water Content Meter Check List

L 4500
n L 250

TOTW for auto selection Height: FL200

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES	
						INFLIGHT	*PREFLIGHT*
1050	TWCD	70	1167	✓		0001–4095	
	TNOS	71	2511	✓		2000–3460	< *min*
	TSAM	72	1240	✓		0640–1860	< *min*
	TAMB	73	2578	✓		2400–3200	
	TSRC	74	2258	✓		2160–2470	
	HTR1	75	0610	✓		0000–4095	< 4095
	HTR2	76	1472	✓		0000–4095	< 4095
	ISRC	77	1020	✓		0001–1230	< *min*
	STAT	78	4095			4095	
	EV1V	170	3476				
	EV2V	171	3137				
	NPWR	172	2705				
	EVIC	173	4019				
1058	EV2C	174	4009				

200 →
150 ✓
100 ✓
050 ✓
3600
1020

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon	Off / On	Large/Small
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon	Off / On	

Flight Leader's ~~Pre~~/In-Flight Check List

7

3822

2442

Flight No: A533 Date: 050491 Page....3..of 3

CHEK for auto selection FL200

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES INFLIGHT | *PREFLIGHT*
1140	REF +	5	567	/		Approx 0568
	REF -	7	2853	/		Approx 2858
	AOSS	19	1935	F/S / O/S	TORQUE	2047 st. and level
	AOA	18	1747	F/S / O/S	TORQUE	2047 st. and level
	RD HT	37	4095	FL200	/	As Indicated | 0000
	PR HT	8	1793	20.0	FL200 /	As Altimeter
	CABP	14	3070	935	/	
	A/S	9	2000	227	230 /	As ASI | 0000 – 0100
	UP1S	81	2310	768	780	
	UP2S	82	2003	372	416	
	UIRS	83	981	-205	1559	
	UP1Z	84	149	/		Approx 0147
	UP2Z	85	142	/		Approx 0149
	UIRZ	86	980	JNOZ		Approx 2061
	UP1T	87	2999	-6	-6.1	As IAT
	UP2T	88	3011	-6		As IAT
	UIRT	89	0000	JNOZ		As IAT
	LP1S	91	4048	1570	529 10	SPIKING
	LP2S	92	1214	270	223 10	"
	LIRS	93	867	JNOZ	-240	"
	LP1Z	94	496			Approx 0150 "
	LP2Z	95	268			Approx 0146 "
	LIRZ	96	896	JNOZ		Approx 2050 "
	LP1T	97	2994	-6	-6	As IAT "
	LP2T	98	3005	-6		As IAT "
	LIRT	99	257	JNOZ		As IAT "
	J/W	42	1071	0	-0.03	As Indicated | 0000
	HYGR	58	1073	-45	-45	
	HYCC	59	894	/		696–901
	FDEW	138	1099	-45	/	DP = (DRSU/20)-100 C
	FSTA	139	929			
	DTF	10	2979	-6		
	DTC	11	4			
	NDTF	23	2671	-6		same as De-Iced
	NDTC	24	4			
	INCT	48	2601			
	HEIM	141	2045			
	PRTC	142	2378	/		approx 2380
	TWCD	70	1184	/		0000–4094
	TSAM	72	1329			0640–1860 | < *min*
	O3	100	225			
	O3P	106	1894	903		P≃ (*DRSU* x 0.4) + 145*mB*
	O3RG	113	1874			
1211						

Flight Leaders' ~~Pre~~/In-Flight Check List

BCDS for auto selection

GMT	PARA.	NO.	H/D	D.R.S.	DECODE	INSTR	EXPECTED VALUE
1217	FL NO	1	Hex	0533	A533		Flight No.
	GMTH	2	Hex	121			Clock: First 4 No.s
	GMTM	3	Hex	909	/		Clock: Last 4 No.s
	E/M	4	Hex	0030	/		Event Mark Counter
	INCH	49	Dec				Multipxd Hkeeping
-12 / 2284	1252 : 3854 .	/ 2284	142	2286	3785	2291	173
	LATC	160	Dec	528	46.46		Latitude
	LONC	161	Dec	3865	-19.88		Longitude

Total Water Content Meter Check List

TOTW for auto selection Height: FL200

GMT	PARA	NO	D.R.S.	DECODE	INSTRUMENT	EXPECTED VALUES	
						INFLIGHT	*PREFLIGHT*
1226	TWCD	70	1222	✓		0001–4095	
	TNOS	71	2506	/		2000–3460	< *min*
	TSAM	72	1282	/		0640–1860	< *min*
	TAMB	73	2566	/		2400–3200	
	TSRC	74	2222	/		2160–2470	
	HTR1	75	1959	/		0000–4095	< 4095
	HTR2	76	1365	/		0000–4095	< 4095
	ISRC	77	1017	/		0001–1230	< *min*
	STAT	78	4095	/		4095	
	EV1V	170	3479				
	EV2V	171	3139				
	NPWR	172	2709				
	EVIC	173	4016				
1239	EV2C	174	4000				

BROAD BAND RADIOMETER FIT (pre-Flight only)

	PARA NO	POSITION	DOME	COVERS	OBSCURERS
UPPER	81,84,87 82,85,88 83,86,89	Port Stbd Centre	Clear Red Silicon	Off / On	Large/Small
LOWER	91,94,97 92,95,98 93,96,99	Port Stbd Centre	Clear Red Silicon	Off / On	

Flight Leader's In-Flight Log

Flight No A 533 Date 05 04 97 Page 1 of 2

Video Tape	
No.	11 16
Ends	A533#1
FFC / DFC / RFC	

	GPS	INU
Lat	55° 30·61N	55°30·56N
Long	004° 36·45W	004° 36·51W
Time	063156	063227
Status	OK	GC ALIGN

DRS recording to HORACE (y) / n

HORACE recording to disc (y) / n

SATCOM sending pos. reports (y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
260502				DATA	ON					
274740				SET	TO	NAV				
280845				TAKE	OFF	PRESTWICK				
				START	RUN 1		Wet chemistry run.			
081412	11	4000	1004	250	190	3·2	4·4	OFF		308/24
				END	RUN 1					
081917	12	4000	1004	280	190	4·1	5·8	OFF		300/27
				START	RUN 2					
082330	13	FL085	1013	295	180	0·2	-0·7	OFF		300/28
				END	RUN 2					
082503	14	FL085	1013	300	180	0·1	-0·1	OFF		300/27
				Climb	to avoid		cloud.			
				START	RUN 3					
083649	15	FL160	1013	305	180	-14·9	-17·8	OFF		300/31
				END	RUN 3					
085854	16	FL160	1013	290	185	-14·8	-22·3	OFF		296/33
				START	P1					1000 fpm
090826	17	FL160	1013	290	180	-13·4	-24·6	OFF		294/33
091531	18	8000	1006	290	185	0·6	-1·2	OFF	293/21	500 fpm
				&						

Video Tape	
No.	A533d1
Ends	1146
FFC / DFC / RFC	

	GPS	INU
Lat	56° 00.2N	55°54.56N
Long	10° 02.36W	10°05.72W
Time	09 22 03	
Status	Or	NAV

DRS recording to HORACE	y / n
HORACE recording to disc	y / n
SATCOM sending pos reports	(y) / n

R4.

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
				END	P1					
042800	19	900	1015	270	180	8.4	9.7	OFF		/
										SS=
				START	RUN 4					
042818	20	1000	1015	270	180	8.4	9.8	OFF		285/21
										SSW
				END	RUN	4 /START	P2.1	↗		1000 FPM
043717	21	1000	1015	270	180	8.4	9.8	OFF		285/21
				END	P2.1	//	START	RUN 5	↱	
044444	22	FL050	1013	270	185	4.4	4.5	OFF		293/22
				END	R5	//	START	P2.2	↗	1000 FPM
045152	23	FL050	1013	270	180	4.6	5.1	OFF		290/22
				END	P2.2	//	START	R6.1		
045650	24	FL100	1013	270	180	-2.3	-4.2	OFF	↱	289/24
				END	R6.1	//	START	R6.2		
100348	25	FL100	1013	270	190	-2.8	-3.4	OFF		284/23
				END	R6.2	//	START	P2.3		1000 FPM
101012	26	FL100	1013	265	190	-3.5	-3.9	OFF		288/21
				END	P2.3	//	START	R[illegible]	↱	
101513	27	FL150	1013	265	190	-13.1	-12.8	OFF		267/24
					↱					
				END	R[illegible]	//	START	P2.4		1000 FPM
102012	28	FL150	1013	265	190	-12.2	-14.7	OFF		267/23
				Accelerate to		make	Oceanic	Boundary		
				END	P2.4	//	START	R8		
102627	29	FL200	1013	220	180	-20.3	-36.1	OFF		273/36

Flight Leader's In-Flight Log

light No A 533 Date 0504 97 Page 2 of 2

Video Tape
lo. A533 #1
inds CHANGED @ 1400.
FC / DFC / RFC

	GPS	INU
Lat	54° 52.26 N	54° 49.18 N
Long	015° 02.45 W	015° 04.45 W
Time	10 28 50	10 29
Status	OK	NAV

DRS recording to HORACE (y) / n

HORACE recording to disc (y) / n

SATCOM sending pos. reports (y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
			END	RUN	8					
04337	30	FL200	1013	225	220	-19.8	-41.5	OFF		275/30
				TRANSIT	TO	SANTA	MARIA			
				VIDEO	TAPE	PAUSED.				
				START	RUN 9.					
32441	31	FL200	1013	200	230	-22.3	-32.6	OFF		125/9
				VIDEO	RESTARTED.					
				END	RUN	9				
134433	32	FL200	1013	230	230	-22.9	-30.4	OFF		101/9
				START	P 3.1					
34523	33	FL200	1013	225	180	-21.8	-28.8.	OFF		102/8
				END	P3.1	//	START	R 10		
135006	34	FL150	1013	225	180	-12.4	-16.9	OFF		094/5
				END	RUN 10	/	START	P3.2		
35646	35	FL150	1013	225	180	-12.3	-17.0	OFF		113/4
				END	P3.2	//	START	R11		
140135	36	FL100	1013	230	180	-1.4	-5.0	OFF		095/03
				END	RUN	11 //	START	P3.3		1000 ft
140851	37	FL100	1013	223	180	-0.1	-4.9	OFF		098/5

search Flight

Video Tape	
No.	A533 #2
Ends	1700
FFC / DFC / RFC	

	GPS	INU
Lat	38° 38·76N	38° 36·15 N
Long	24° 28·53W	24° 31·35W
Time	14 10 36	14 1104
Status	OK	NAV

DRS recording to HORACE	(y) / n
HORACE recording to disc	(y) / n
SATCOM sending pos reports	(y) / n

GMT	EVM	Height	QNH	Hdg	IAS	TAT	DP	DI Htr		Wind/ Sea st.
				END	P3·3	//	START	R 12.		
141254	38	6000	1016.	230	180	9·4	-1·4	OFF		083/4.
				END	R12	//	START	P3·4		1000/min
143231	40	6000	1017	240	185	9·8	-2·6	OFF		103/8
				END	P3·4	//	START	R13		↓
143519	41	3500	1015	180	180	13·4	-1·2	OFF		083/9
				END	RUN	13	// START P3·5			500/m
144055	42	3500	1015	180	180	11·6	0·8	OFF		068/9
				END	P3·5	//	~~START~~ ~~RUN 14~~			55=4
144717	43	500FC	1016	175	180	15·5	13·2	OFF		022/7
				START		RUN	14			
144922	45	100FC	1016	110	180	15·5	12·4	OFF		029/7
				END	RUN	14				
145804	46	100FC	1016	110	180	15·6	13·0	OFF		028/7
150730				LAND	SANTA		MARIA			
				HOLD	AT		36° 59·30N			
							025° 09·85W.			
152222				DATA	OFF					

Research Flight

OAO(4) . IC 1600 17 12

FLIGHT LEADER'S INSTRUMENT STATUS REPORT

FLIGHT NO: A533 DATE: 05/04/97 MRF

INSTRUMENT	FITTED	OPERATED	COMMENTS
NAVIGATION:			
GPS	✓		
OMEGA	✓		
INU	✓		
RADALT	✓		
THERMOMETERS:			
DI TEMP	✓		
NDI TEMP	✓		
ICTP	✓		
HEIMANN	✓		
HYGROMETERS:			
GEN. EASTERN	✓		
TWC	✓		
FWVS	✓		
J/W	✓		
EXP. PITOT HEAD:	✓		
STATIC PRESS.	✓		
PITOT PRESS.	✓		
GUST VANES	✓		
RADIOMETERS:			
UPPER CLEAR	✓		
UPPER RED	✓		
UPPER SILICON	JNO2		
LOWER CLEAR	✓		
LOWER RED	✓		
LOWER SILICON	JNO2		
MARSS	X		
SAFIRE	X		
DEIMOS	X		
ARIES	X		
CHEMISTRY:	✓		
OZONE	✓		
ECGC	✓		
NOX	✓		
OTHERS:			
CCN	X		
CLOUD PHYSICS	X		
CABIN PRESS	✓		
NEPHELOMETER	X		
PSAP	X		

P.T.O. FAULTS/INCIDENTS

CARRIER GAS 5% METHANE IN ARGON
HUMIDIFIED BY $CuSO_4 \cdot 5H_2O$.

VIDEO TAPE LOG

Flight No A 533

Project ACSOE Date 05 04 97

Tape No A533#1 User KATE Retention Period 10 YRS

GMT	Tape Counter	Camera Position	Remarks
0816	0	FFC	RUN1. 4000'
0823			RUN 2 FL085
0836			RUN 3 FL160
0908			PROF1 FL160 → 900 RC
0928			RUN 4 1000 RC
0946			RUN 5 FL050
0956			RUN 6.1 FL100
1003			RUN 6.2 FL100
1015			RUN 7 FL150
1026			RUN 8 FL200
1045			TAPE PAUSED
1324.			RUN 9 FL200 TAPE RESTARTED
1350			RUN 10 FL150.
1401			RUN 11 FL100. CHANGE TAPE.

Met Research Flight

VIDEO TAPE LOG

Flight No A 533

Project ACSOE

Date 050497

Tape No A533 #2 User KAYE

Retention Period 10 YRS

GMT	Tape Counter	Camera Position	Remarks
1400		FFC	RUN 11 F-1400
1412			RUN 12 6000 RF
1435			RUN 13 3500 RF
1448			RUN 14 100 FF
1507			LAND SANTA MARIA. AZORES.

Met Research Flight

SAMPLE BOTTLE RECORD

Flight No. AS33 Date 5/4/97 Sheet no. 1

Sample no.	Bottle no.	Fill press Flare	E/M	Height	PRESSURE PURGE TIME	PRESSURE FILL TIME	PRESSURE END TIME	True pressure (mb)	Remarks (RUN NO. etc).
1	R10	7.2 bar		10001	092817	093100	093128	978	Run 4
2	R30	7.2 bar		5000'	~~094630~~ ~~094748~~	~~094748~~ ~~0948~~	094826	843	Run 5
3	R36	7.16 bar ~~6.9 bar~~		10000'	095714	100400	100507	697	Run 6.2
4	R6	6.9 bar		15000'	101514	101655	101904	571	Run 7
5	R8	5.4 bar		20000'	102638	102833	103057	465	Run 8
6	R2	5.25		20000	134015	134210	134412	467	Run 9
7	H3 ~~R10~~	6.9		15000	135020	135152	135400	592	Run 10
8	R29	7.1		10000 ~~140154~~	140154 ~~140340~~	140340	140444	698	Run 11
9	R4	7.2		6000'	141400	141500	141540	817	Run 12
10	R37	7.2		3500'	143520	143700	143732	894	Run 13
11	R12	7.2		100'	144820	145014	145040	1013	Run 14

BAG Fillers Log

Flight No	Date	Operator
AS33	5/4/97	DaveT

1/1

Time start	Bag No	Event End	Height	Run	Comments
093250	231	093308	1000'	Run 4	
094426	234	094936	5000'	Run 5	
100578	232	100552	10000'	Run 6.2	
101720	235	101750	15000'	Run 7	
102907	233	102942	20000'	Run 8	
104500	S14	104538	20000'	Transit	
110056	S17	110140	20000'	Transit	
111917	S15	112007	"	"	
113405	S21	113446	"	"	
114844	S38	114939	"	"	
120445	S13	120555	"	"	
121846	S16	12~~1346~~ 1936	"	"	
123340	1024	123430	"	"	
124850	1025	124935	"	"	
130339	84	130421	"	"	
131904	62	132000	"	"	
133220	82	133307	"	"	
134545	171	134620	"	R9 / P3.1	PROFILE JUST STARTED
135210	S2	135242	15000'	R10	
~~14~~ 0403	1026	140429	10000'	Run 11	
141508	172	141537	6000'	Run 12	
143746	154	143803	3500'	Run 13	
145050	153	145105	100'	Run 14	

Instrument Log Sheet: Remote

Flight No: 533 **Date:** 5/4/97 **Page:** 1 /

Campaign: ACSOE/ACME TRANSIT **Operator(s):** BBB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
			Zero	Mode A = 620 B = 620.
06:58			Cal	Hv A 1.37 Hv B 1.21 30 Range
				DES) 240 A & B
				) 245 A & B
				1.4 L/min
				Remote Run @ 40 setting
07:08:35				Range Change
07:53:30			ZeroOn	Cabin Intake
08:13	4000'		ZeroOn	End of Ascent
08:14	4000'	Run 1	Zero off	
8:16:40				Program to Zero of Next
				⇒ 160 sec lag. H_2O_2
				190 sec lag Org.
08:19:12		End Run 1		
	↑			Climb ≈ 6000'
08:23:29	8500'	ST Run 2		
08:24:16			ZeroOn	Climbing to get above cloud
08:25:03		End 2		
08:27			ZeroOff	Zero A & B .04
08364	16000'	START Run 3		
0839			ZeroOn	
0842			ZeroOff	
0846	16000'			1.4 L/min indicated
085854	16000'	End R3		Radio descent to 1500'
	↓	St P		
090825		St P1		Down 16000 @ 1000'/min
091531	8500'			500'/min Descent
0922	4500'	↓		

Instrument Log Sheet: H2O

Flight No: 533 **Date:** 5/4/97 **Page:** 2 / ____

Campaign: ~~ACSOE~~ / AZORA TRANSIT **Operator(s):** RSB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
0926	2000'	EP1	M	1.4 L/min Air Flow
0928	1000'	SP4		
09		ER4+		In Cloud
0937 ~~37~~	↑	SP2.1		Climbing @ 500'/min
093717	5000'			
094044	5000'	SP5		
095151		ER5		
	10000 ↑	SP2.2		Climbing @ 1000'/min
				In & out Cloud.
95520				Near cloud Tops
95649		End P2.2		
+ ~~4~~	10000	SP6.1		
095700		Zero On		Zeroing on Hcho / H2 / H2O2
100000		~~Zero Off~~		
100251		ER6.1		
	→	SP6.2		Data run
101013		ER6.2		
101013		SP2.3	to 15000'	1000'/min
105:12		EP2.3		
10512	15000'	~~SP7~~		
102012		ER7		
	↑	SP2.4		Ascent up to 20000' &
				Transit to Alones @ warp
				Speed.
10:21 47	16508			1.35 Tdar Ratio
	17500			1.28
	19100			1.2
102626	20000'	EP2.4		-15°C Wind 275°
1032	20000		Zero On	@ 66 kts
1035	20000		End Zero	

Instrument Log Sheet: H2O

Flight No: 533 **Date:** 5/4/17 **Page:** 3 /

Campaign: ACCDE/BLOCKS TRNDT **Operator(s):** SR

Time (GMT)	Altitude	Run	Zero /Cal	Comments
122500	20000'		Zero On	ΔRB@.04 Volts.
122900	20000'		Zero dn	1.15 L/min Flow
(Set ground alt, Ian Anderson Keigh / K. Law				Contouring Correlations 1.1 H_2O_2 mes / H_2O_2 model For level 10.35 – 1220 Also regular comparison with O_3 & Water Vapor
130120			Zero On	Zero my comparison
130420			Zero dn	
				Would open system to cope with fast speed of airplane
132441	20000'	SLm 9		
134524	20000	EP9		
134524	↓	SP3.1		Raising waters to 50'
135006	15000'	EP3.1		
135006		SR10		Flow rate 1.4 L/min
135646	15000'	ER10		
135646	↓	SP3.2		(1.2 g/kg H_2O @ 15000')
140135		EP3.2		
140135	10000'	SR11		~180 knots indicated speed
140850	10000'	ER11		
140850	↓	SP3.3		Flow Rate 1.4 L/min
141255		EP3.3		
141255	6000'	SR12		
		ERR	I	
141520			Zero On	B 0.04 / A 0.03
142120			Zero dn	
143231	6000'	ER12		
143231	↓	SP3.4		Descending to 3500'
1435		EP3.4		

Instrument Log Sheet: ~~TOC~~

Flight No: 533 Date: 5/4/17 Page: 4 / ____

Campaign: ~~ARSOA~~ Nexus Operator(s): ~~TAB~~

Time (GMT)	Altitude	Run	Zero /Cal	Comments
143519	3500'	SR13		
144056	3500'	ER13		@ 50'
144056	↓	SP35		
144717	↑ 50'	EP35		
144822	100'	SR14		@ 100'
145805	100'	ER14		
145850			Zero Air	
			Dark	
		London		Azores Santa Maria

Instrument Log Sheet: Remote

Flight No: 533 Date: 5/4/97 Page: 1 / ____

Campaign: ACSOE / ATOLE TILAMOOK Operator(s): BJB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
			Zero	Mode A = 620 B = 620
06:58			Cal	Hv A 1.37 Hv B 1.21 30 Range
				DES D 240 ↓ A & B
				" 245 A & B
				1.4 L/min
				Pressure Pump @ 40 setting
07:08:35				Pump Change
07:53:30			Zero On	Liquid Introduced
08:13	4000'		Zero On	End of Ascent
08:14	4000'	Run 1	Zero off	
8:16:40				Response to Zero of Nebulizer
				⇒ 160 sec lag H_2O_2
				190 sec lag Org
08:19:12		End Run 1		
	↑			Descent ≈ 6000'
08:23:24	8500'	Start Run 2		
08:24:16			Zero On	Climbing to get above cloud
08:25:03		End 2		
08:27			Zero Off	Zero A & B .04
08:36:40	16000'	Start Run 3		
0839			Zero On	
0842			Zero off	
0846	16000'			1.4 L/min indicated
085854	16000'	End R3		Radial descent to 180'
	↓	St P		
090825		St P1		Ivan 16000 @ 1000'/min
091531	8500'			500'/min Descent
0922	4500'	↓		

Instrument Log Sheet: H2O

Flight No: 533 **Date:** 5/4/07 **Page:** 2 / ____

Campaign: ACSOE (AZORES TRANSIT) **Operator(s):** RSB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
09 26	2000'	EP1	M	1.4 L/min Air Flow
0928	1000'	SP4		
09		EP4+		In Cloud
093717	↑	SP2.1		Climb @ 500'/min
093717	5000'			
094644	5000'	SP5		
095151		EP5		
	10000↑	SP2.2		Climb @ 1000'/min
				In & out Cloud.
95523				Noon Cloud Tops
95649		End P2.2		
+ ↘	10000	SP6.1		
095700		Zero On		Zeroing on Hexo/H2O2/H2O2
100000		Zero Off		
100051		EP6.1		
	→	SP6.2		Data run.
101013		EP6.2		
101013		SP2.3	To 15000'	1000'/min
105:12		EP2.3		
105:12	15000'	SP7		
102012		EP7		
	↑	SP2.4		Accelerate up to 20000' &
				Transit to Azores @ warp
				Speed.
10:21 47	16500			1.35 True Rate
	17500			1.28
	19000			1.2
102626	20000'	EP2.4		-15°C Wind 275°
1032	20000		Zero On	@ 66 knots
1035	20000		Zero Off	

Instrument Log Sheet: H_2O_2

Flight No: 533 **Date:** 5/4/97 **Page:** 3 /

Campaign: ACSOE / BLOCKS TRNDT **Operator(s):** [redacted]

Time (GMT)	Altitude	Run	Zero /Cal	Comments
122500	20000'		Zero On	Δ=3@.04 Volts.
122900	20000'		Zero off	1.15 L/min Flow
(Cat	ground alt, Ken			Conversion Correlation 1.1
Andrew Leigh / K. Law				H_2O_2 mass / H_2O_2 molecules
				From Denver 10.35 – 1220
				Also negative correlation with O_3 & water Vapor
130120			Zero On	Zero my contribution
130420			Zero off	
				Would open system Pressure
132441	20000'	Slow		will limit speed of airplane
134524	20000	ER9		
134524	↓	SP3.1		Profiling winds to 50'
135006	15000'	EP3.1		
135006		SR10		Flow 1.4 L/min
135646	15000'	ER10		
135646	↓	SP3.2		(1.2 mb H_2O_2 @ 15000')
140135		EP3.2		
140135	10000'	SR11		180 knots indicated Speed
140850	10000'	ER11		
140850	↓	SP3.3		Flow Rate 1.4 L/min
141255		EP3.3		
141255	6000'	SR12		
		ER12	I	
141520			Zero On	B 0.04 / A 0.03
142120			Zero off	
143231	6000'	ER12		
143231	↓	SP3.4		Descending to 3500'
1435		EP3.4		

Instrument Log Sheet: H2O2

Flight No: 533 Date: 5/4/97 Page: 4 / ____

Campaign: ~~ACSOE~~ Monitor Thunder Operator(s): [redacted]

Time (GMT)	Altitude	Run	Zero /Cal	Comments
143519	3500'	SR13		
144056	3500'	ER13		@ 50'
144056	↓	SP35		
144717	50'	EP35		
144822	100'	SR14		@ 100'
145805	100'	ER14		
145850			Landing	Azore Santa Maria

PAN GC Log

GC Sample record			Flight Number: A533					Operator: KENT / TIDDEMAN / RICHER								Date: 5/4/97
Sample No.	Time	Height	Channel 1					Channel 2				Channel 3				Comments
			Optimisation = 8					Optimisation = 16				Optimisation = 11				INJECT 40 s (FLOWS NOT ADJUSTED FROM YESTERDAY — INCREASED WHY?)
			Back Flush = 33.53					Back Flush = 43.82				Back Flush = 36.29				
			Flow rate = 31.17					Flow rate = 33.38				Flow rate = 35.58				
			ST	SP	DT	DP	BT	ST	SP	DT	DP	ST	SP	DT	DP	
1		4000f	315.05	1777				317.85	1879			310.85	1643			TO SHORT FOR GC'S
2	082605		315.05	2327	339	1243	27.2	313.9	2159	29.3	1286	311.05	1986	26.8	1321	F NOT CONST NOT BAD THOUGH
3	083726	FL160	315.05	2003	34.1	1196	27.5	314.35	1916	29.4	1230	311.45	1673	26.9	1262	CAB IN PRESS NOT GOOD! *
4 + *	0847.31	FL160	/	/	/	/	/	/	/	/	/	311.85	1684	27.0	1268	NOISE
5	094	FL160	/	/	/	/	/	314.65	1825	29.4	1235	/	/	/	/	NOISE
7 ▽	092835	4000 ft	/	/	/	/	/	314.45	2526	29.4	1339	311.65	2380	26.9	1371	CP = 1044 (CH2 WOW OFF)
8	093122 094402	[illegible]	/	/	/	/	/	[illegible]	[illegible]	/	/	311.85	2146	27.0	1333	CP = 1002
9	094507	FL50	/	/	/	/	28.1	314.75	2277	29.4	1298	/	/	/	/	
10	095720	FL100	/	/	/	/	28.4	315.15	2055	29.5	1281	312.35	1905	27.1	1316	CP = 975
11	100405	FL100	/	/	/	/	28.7	315.35	2092	29.5	1284	312.65	1950	27.1	1319	CP = 978
12	101531	FL150	/	/	/	/	29.1	315.75	1921	29.5	1255	313.15	1772	27.2	1288	CP = 947
13	102651	FL200	/	/	/	/	29.5	316.25	1788	29.6	1238	313.65	1652	27.3	1262	CP = 929
14	103525	FL200	/	/	/	/	30.2	316.55	1797			314.05	1580			AUTO MARKER CP = 926

* Very large water peaks (+ change in inject time to 35 s

▽ Actually an inject on ~~Sample~~ channel 3 (by accident) during descent · 0925.06 ST 311.65 SP 2303

CARRIER GAS 5% METHANE IN ARGON
HUMIDIFIED BY $CuSO_4 \cdot 5H_2O$.

PAN GC Log

GC Sample record			Flight Number: A533					Operator: KENT/RICHER/TUDEMAN				Date: 5/4/97				
Sample No.	Time	Height	Channel 1					Channel 2				Channel 3				Comments
			Optimisation = 8					Optimisation = 16				Optimisation = 11				Inject = 35 s
			Back Flush = 33.53					Back Flush = 43.82				Back Flush = 36.29				
			Flow rate = 31.17					Flow rate = 33.38				Flow rate = 35.58				
			ST	SP	DT	DP	BT	ST	SP	DT	DP	ST	SP	DT	DP	
15	104402	FL200	/	/	/	/	29.2	316.85	1798	29.6	1246	314.35	1583	27.4	1281	
16	105234	FL200	/	/	/	/	/									
17	110116	FL200	/	/	/	~~/~~	30.2	317.05	1802	29.7	1246	314.45	1585	27.4	1283	
18	110849	FL200	/	/	/	/		317.05	~~1801~~			314.45	1581			RUNTIME NPN 502 → 450
19	111446	"	/	/	/	/		317.05	2447			/	/	/	/	CP = 936.
20	113047	"	315.15	2585				317.05	2485			314.25	2326			INJECT 40s
21	114158	"	316.45	788				316.95	788			314.15	658			DISCOUNT
22	114946		316.75	1888				316.75	1830			314.05	1689			CP 935
23	115733		315.15	184				316.05	1831			313.85	1690			
24	120528		/	/	/	/	29.3	316.55	1831	29.6	1248	313.75	1693	27.2	1283	
25	121308		~~316.45~~	/	/	/		316.35	1833			313.55	1690			
26	122053		/	/	/	/		~~316.25~~	~~1828~~							
27	122840		/	/	/	/		316.25	1828			313.45	1687			

NPN CAL

JAN CAL

* SAMPLE TAKEN TOO EARLY DISCOUNT

PAN GC Log

GC Sample record			Flight Number: A533					Operator: RICHER / TIDDEMAN / KENT					Date: 5/4/94				
Sample No.	Time	Height	Channel 1					Channel 2					Channel 3				Comments
			Optimisation = 8					Optimisation = 16					Optimisation = 1				
			Back Flush =					Back Flush =					Back Flush =				
			Flow rate =					Flow rate =					Flow rate =				
			ST	SP	DT	DP	BT	ST	SP	DT	DP		ST	SP	DT	DP	
28	123628	FL200						316.5	1826				313.5	1690			
29	124416	FL 200						316.0	1828				313.15	1689			
30	125202	FL200						315.45	1832				312.05	1690			NOISE
31	125949	FL200					274.6	315.85	1831	29.5	1249		312.95	1690	271	1284	NOISE
32	130736	FL200						315.75	1834				312.85	1691			
33	131523	FL200						315.65	1833				312.75	1698			
34	132310	FL200						315.55	1837				312.15	1700			
35	133058	FL200						315.45	1836				312.45	1701			
36	133903	FL200						315.25	1839				312.25	1702			PRESSURE CHANGE ON GC
37	134648	FL150					279	315.05	1977	29.5	1236		312.05	1840	270	1274	CP = 935
38	135418	FL100						314.85	2175				311.95	2031	327	1357	CP = 1015 *
39	1413	6000ft															CP = 1042
40	141849							NOT FUNCTIONING									

1310 O_3 + NO_y elevated.

* channel 2 not working.

PAN GC Log

GC Sample record			Flight Number: A533					Operator: RICHER / KENT / TIDDEMAN Date: 5/4/97								
Sample No.	Time	Height	Channel 1					Channel 2				Channel 3				Comments
			Optimisation = 8					Optimisation = 16				Optimisation = 11				
			Back Flush =					Back Flush =				Back Flush =				
			Flow rate =					Flow rate =				Flow rate =				
			ST	SP	DT	DP	BT	ST	SP	DT	DP	ST	SP	DT	DP	
41	143229	6000ft										312.65	2187			PC=1040
42	144019	3000ft										313.05	2301			PC=1040
43	144713	1000ft										313.45	2484			
44	14	1000ft										313.85	2473			

LIST OF FORMS USED ON FLIGHT

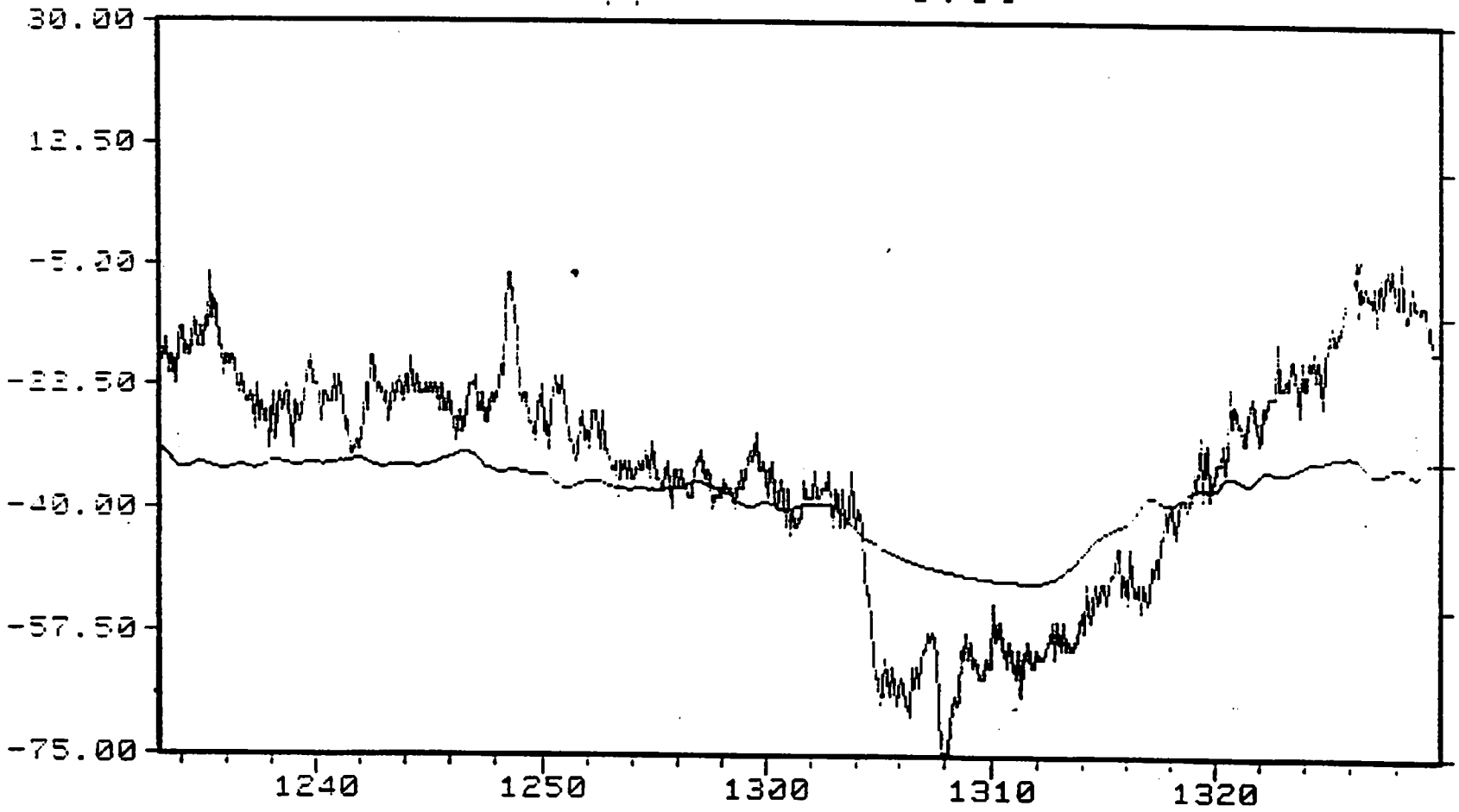
No. of forms	Form Title
4 1	Aircraft Scientist de-briefing sheet Aircraft Scientist log Aircraft Scientist post flight requirements sheet Interactive log
1 OR 3 2 OR 3 2 2	Flight Leader pre-flight check form Flight Leader in-flight check form Flight Leader in-flight log Flight Leader Video tape log (photocopy original)
2 1 1 4	SAFIRE log MISSION SCIENTIST CCN log BOTTLES MARSS log BAGS DEIMOS log PANGCS Chemistry log
	Particulate / Filter boom Operator's log 2DC / FSSP / Holography Operator's log Sonde Ejector's log Navigator's log Photographic log (photocopy original)
1	Instrument status forms RTD prints Raw data plots Weather charts Satellite pictures GPS track

R8

A533 05-APR-97 13:29:51 031 Ω 41.06 -22.66 FC F

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
188.	467.	-19.9	310.	-22.6	-33.3	117/ 8

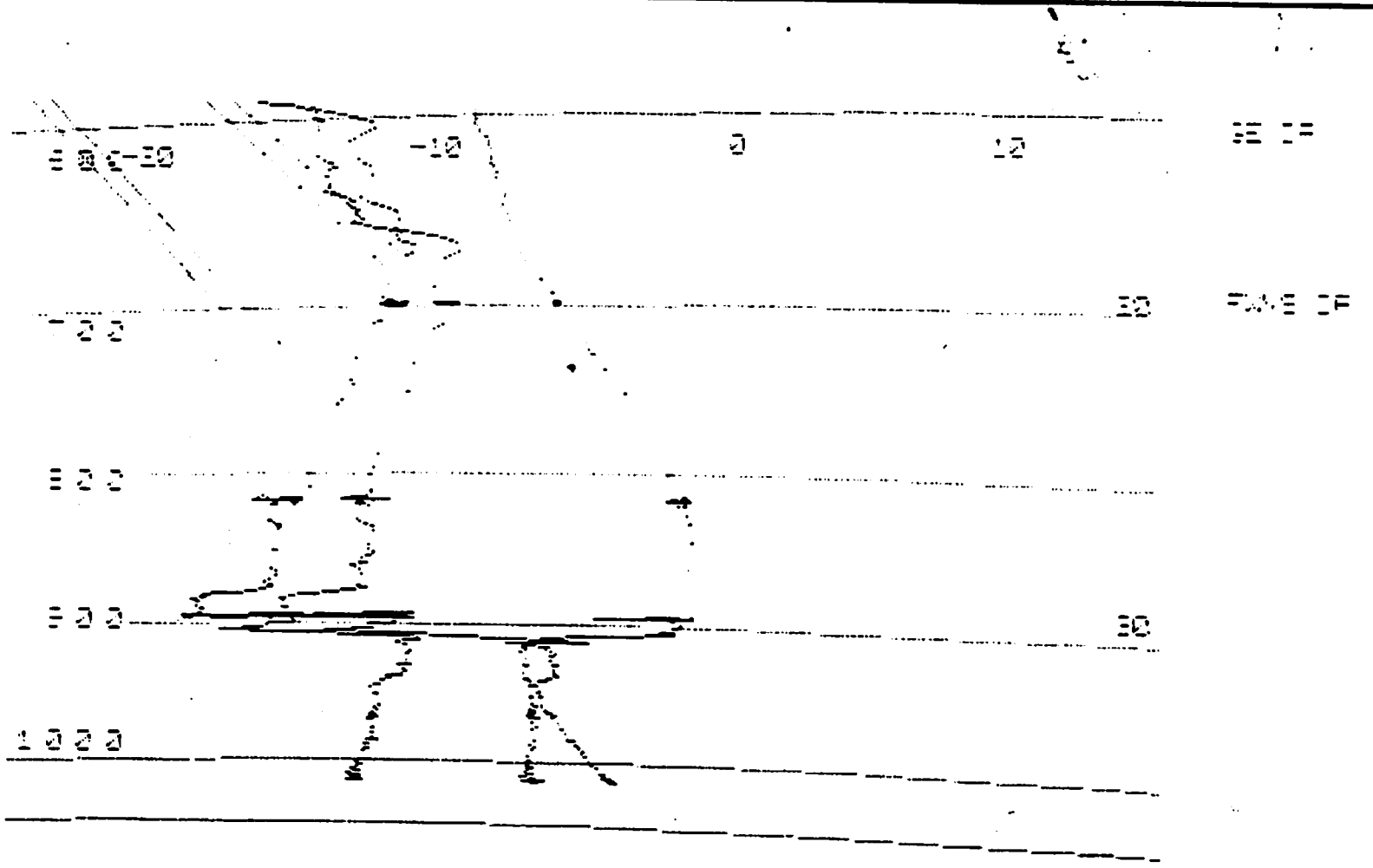
GE DEWP C -33.31 H2O2 MR ppb 0.35



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A533 05-APR-97 14:47:15 042 [illegible] 36.93 -25.44 AS P

HDG deg T	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
154.	1015.	-0.1	179.	15.6	12.7	027/ 7



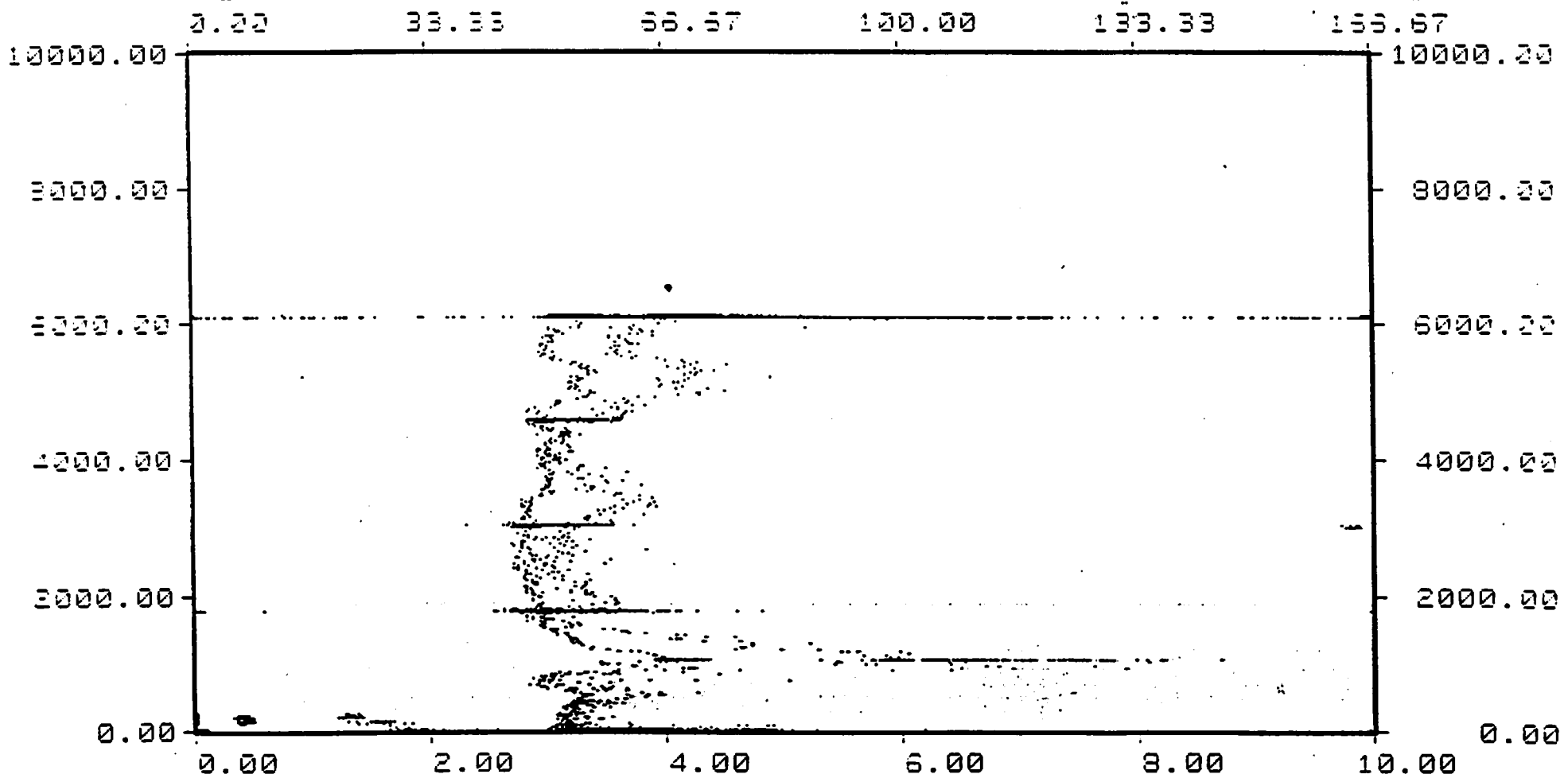
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

P3↓

A533 05-APR-97 15:03:39 046 Ω 36.81 -25.06 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
290.	985.	0.8	155.	13.3	12.0	041/10	

FREE HGT 239.94 m OZONE MR 0.00 ppb NOXY.NOY 0.42

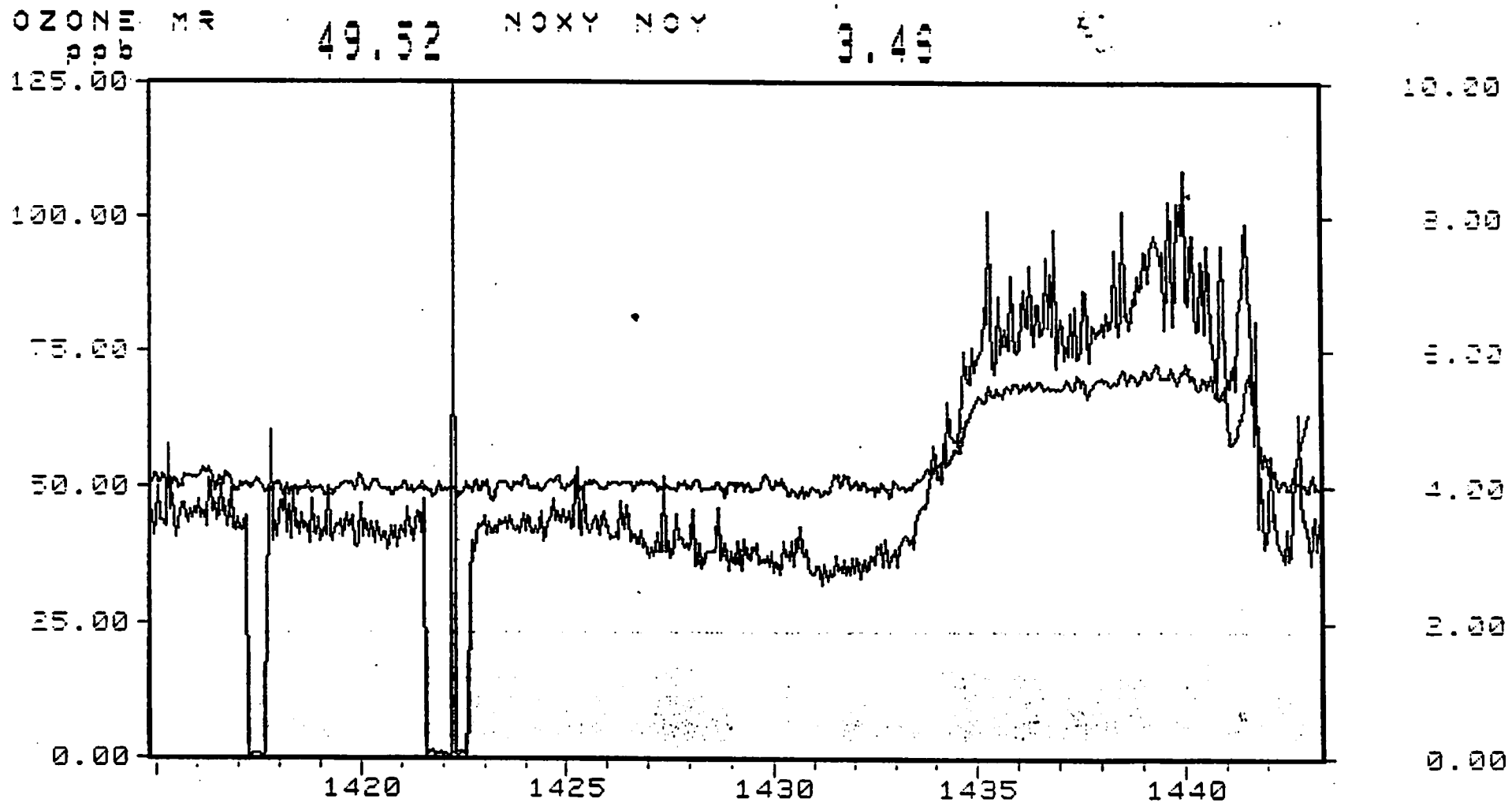


A SELECT	B CHEM	C ZOOM	D	E	F	G VIDEO	H

P31

A533 05-APR-97 14:43:12 042 Ω 37.13 -25.51 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
156.	939.	2.1	186.	9.5	10.2	036/ 7

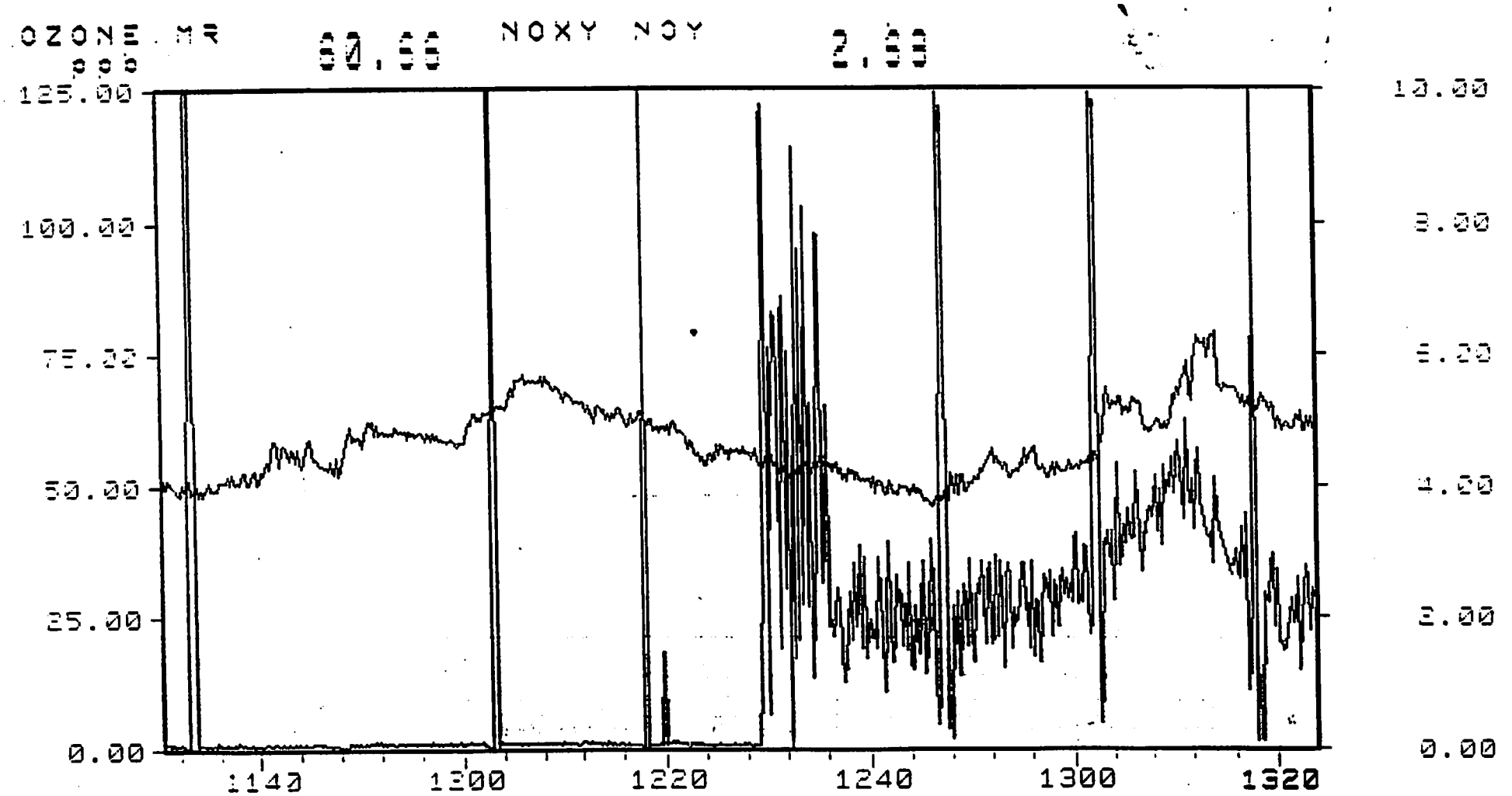


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

R8

A533 05-APR-97 13:23:39 030 Ω 41.58 -22.52 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
188.	467.	19.9	309.	-22.2	-34.2	127/ 9	



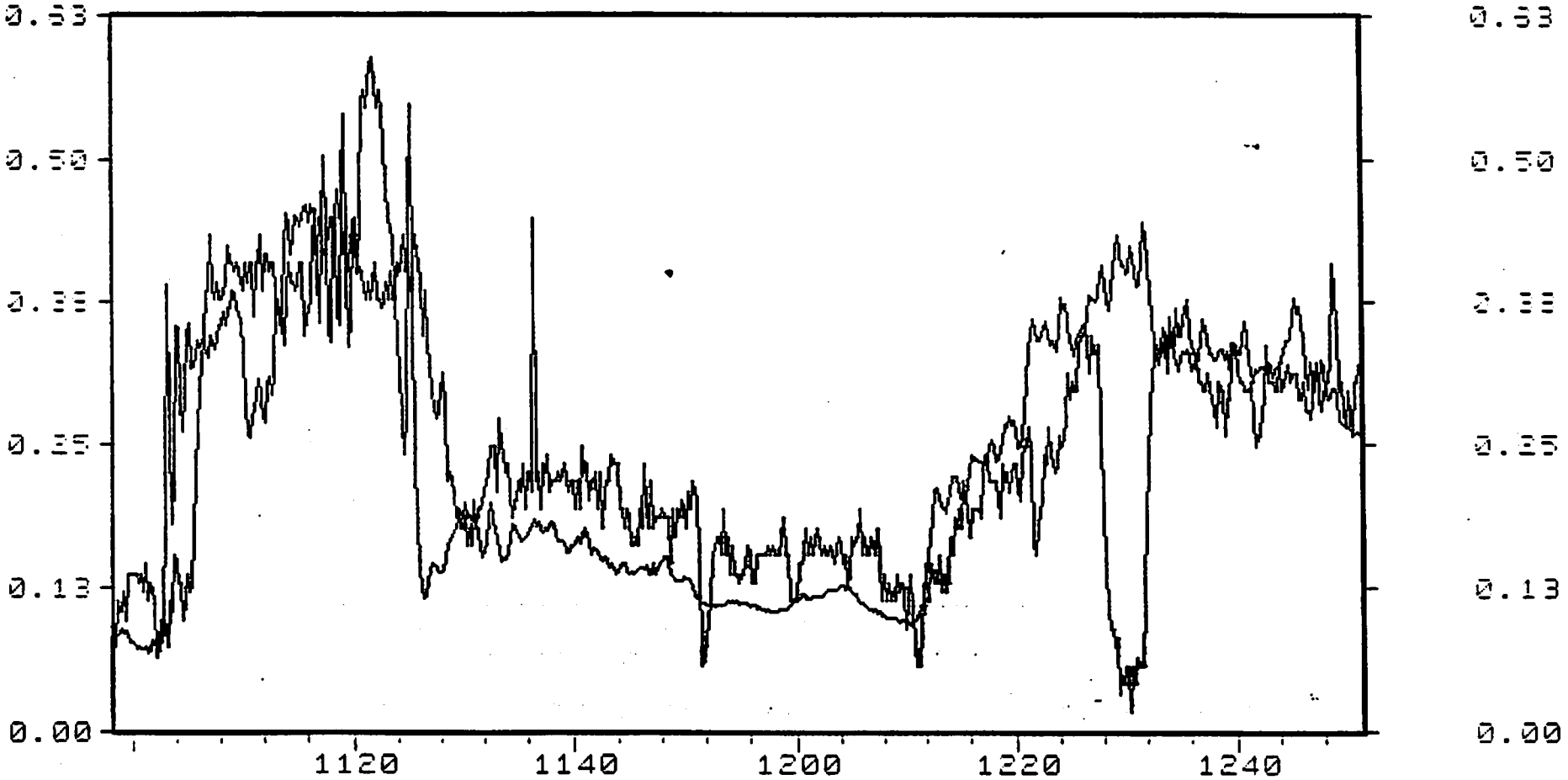
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

is

A533 05-APR-97 12:51:15 030 Ω 44.21 -21.33 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
196.	465.	20.0	307.	-19.5	-37.4	097/ 9	

H2O2 MR ppb 0.30 MOD H2O2 ppb 0.27



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

Cf i) O_3 / H_2O_2 for semi ponded

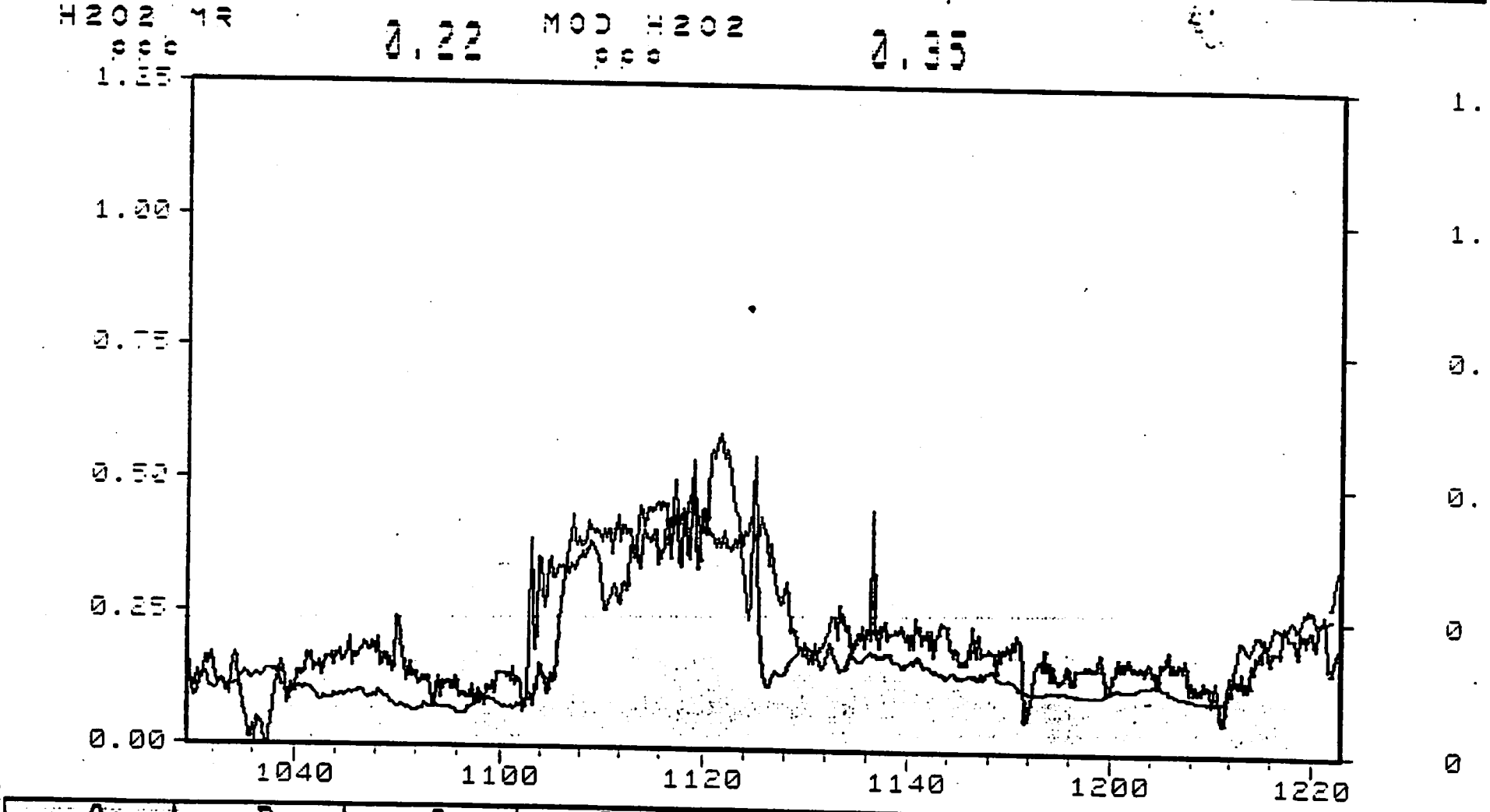
ii) Remember H_2O_2 measured absorb with time

iii) Cf Water Vapour

R8

A533 05-APR-97 12:22:30 030 Ω 46.48 -20.17 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
199.	465.	20.0	304.	-19.3	-33.9	127/ 9	

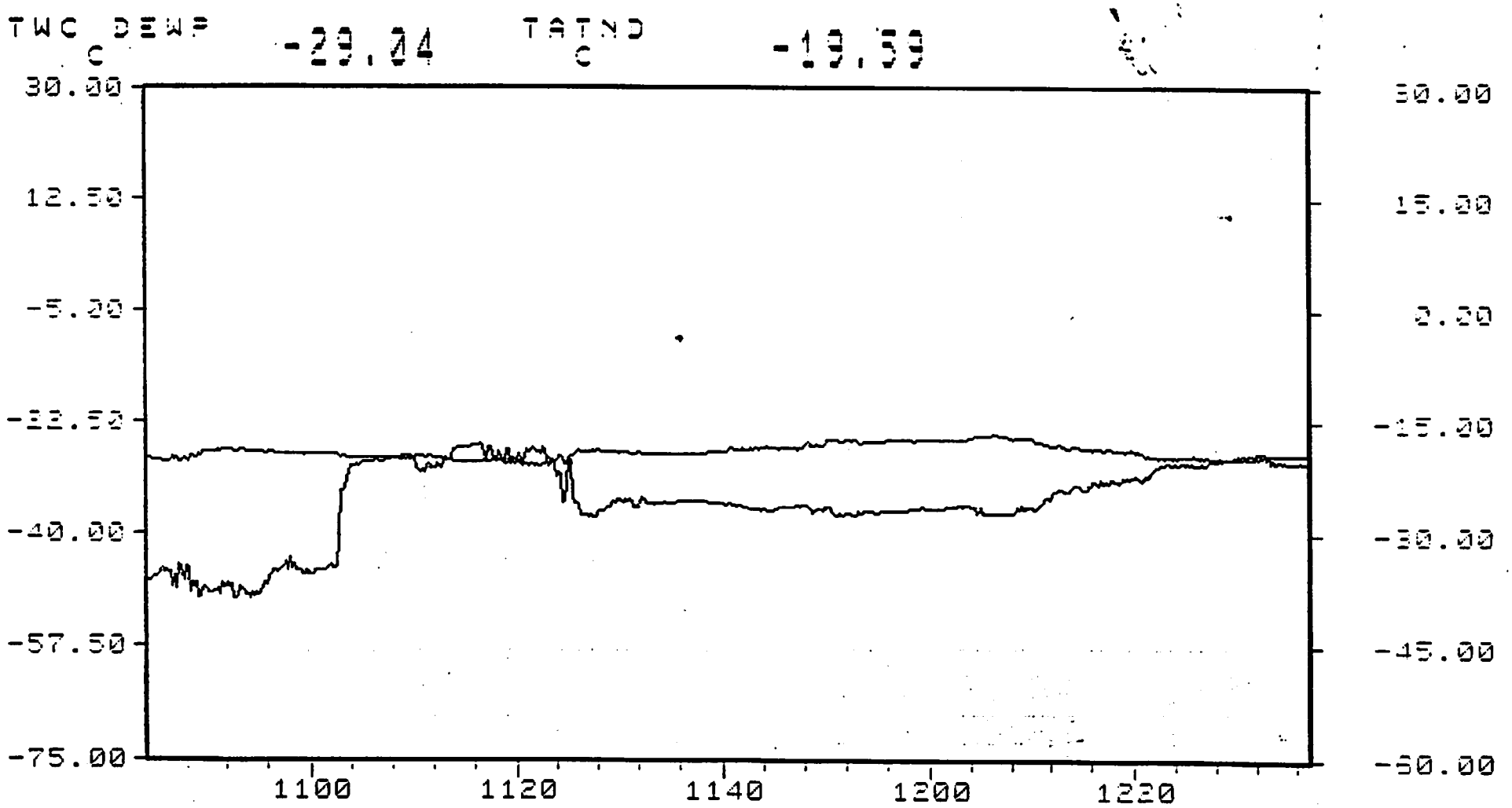


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

RS

A533 05-APR-97 12:37:03 030 Ω 45.34 -20.77 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
195.	465.	20.0	306.	-19.2	-34.6	122/ 9	

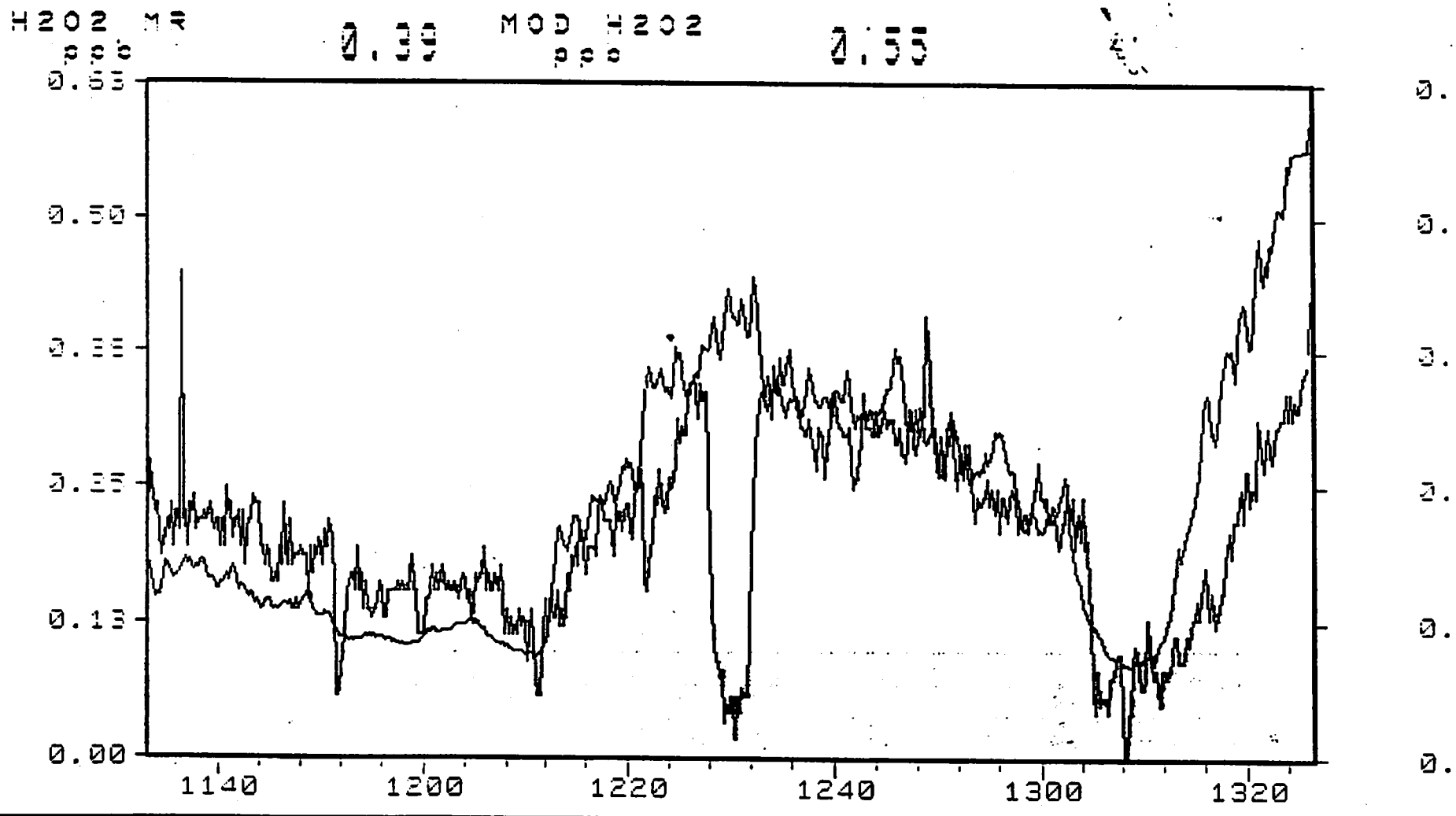


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

R8 (FL200)

A533 05-APR-97 13:26:21 031 Ω 41.35 -22.58 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
188.	467.	19.9	308.	-22.3	-33.1	123/ 8



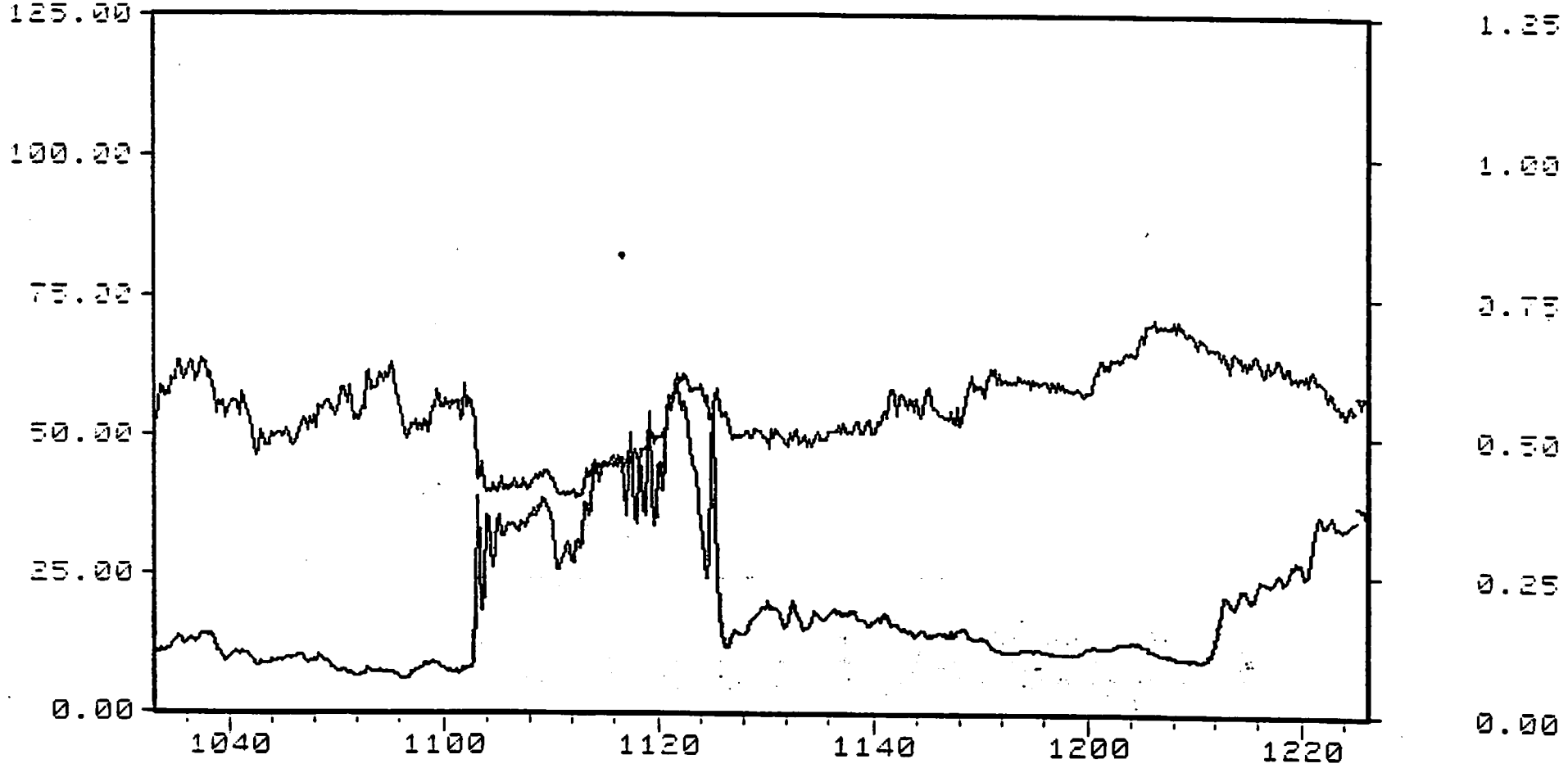
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

R8

A533 05-APR-97 12:25:51 030 Ω 46.23 -20.33 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
199.	465.	20.0	305.	-19.3	-33.9	120/10

OZONE MR ppb 58.37 MOD H2O2 ppb 0.35



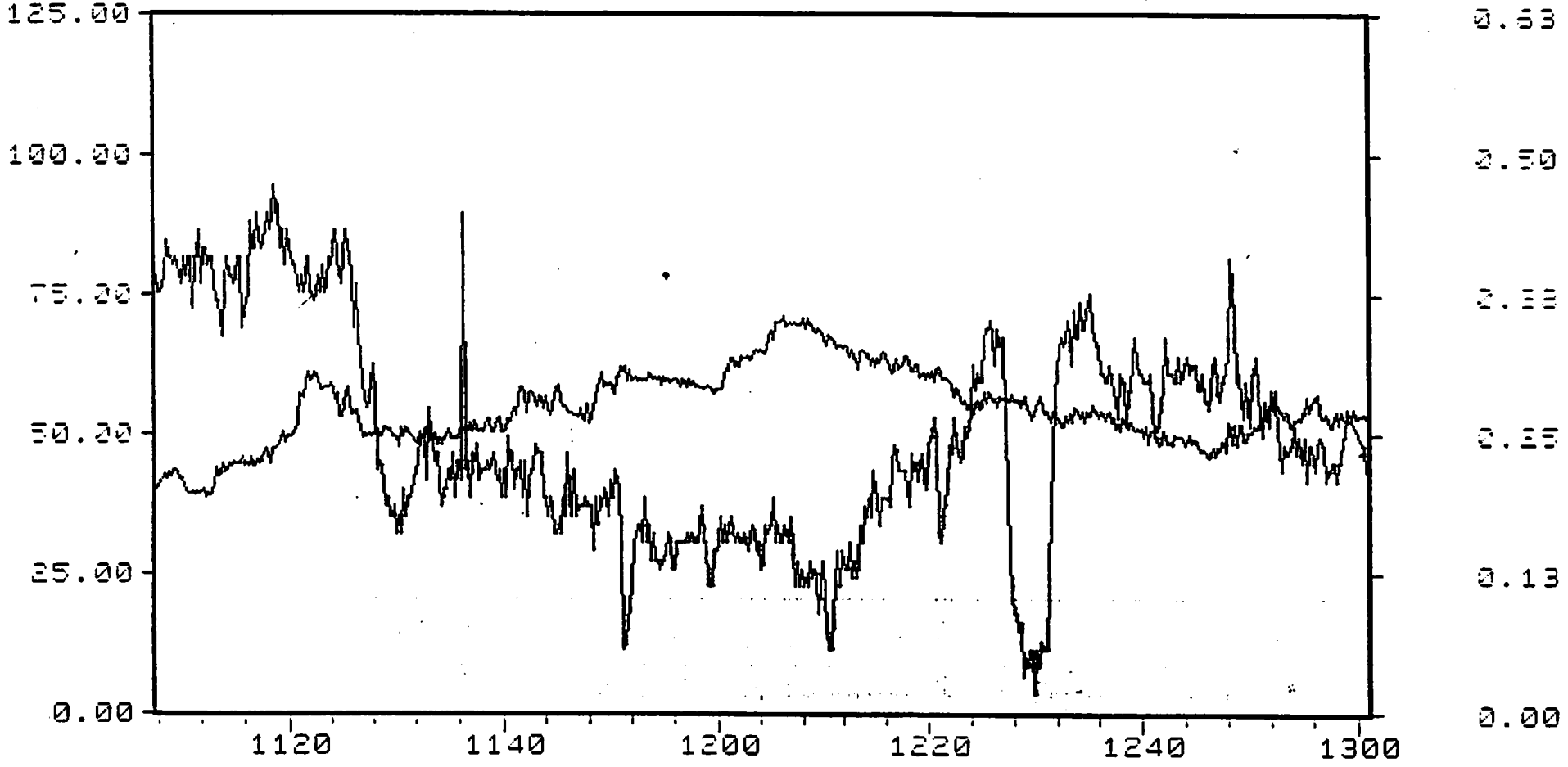
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

R8

A533 05-APR-97 13:00:42 030 Ω 43.44 -21.71 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
196.	465.	20.0	309.	-20.3	-40.2	106/16	

OZONE MR ppb 53.05 H2O2 MR ppb 0.21



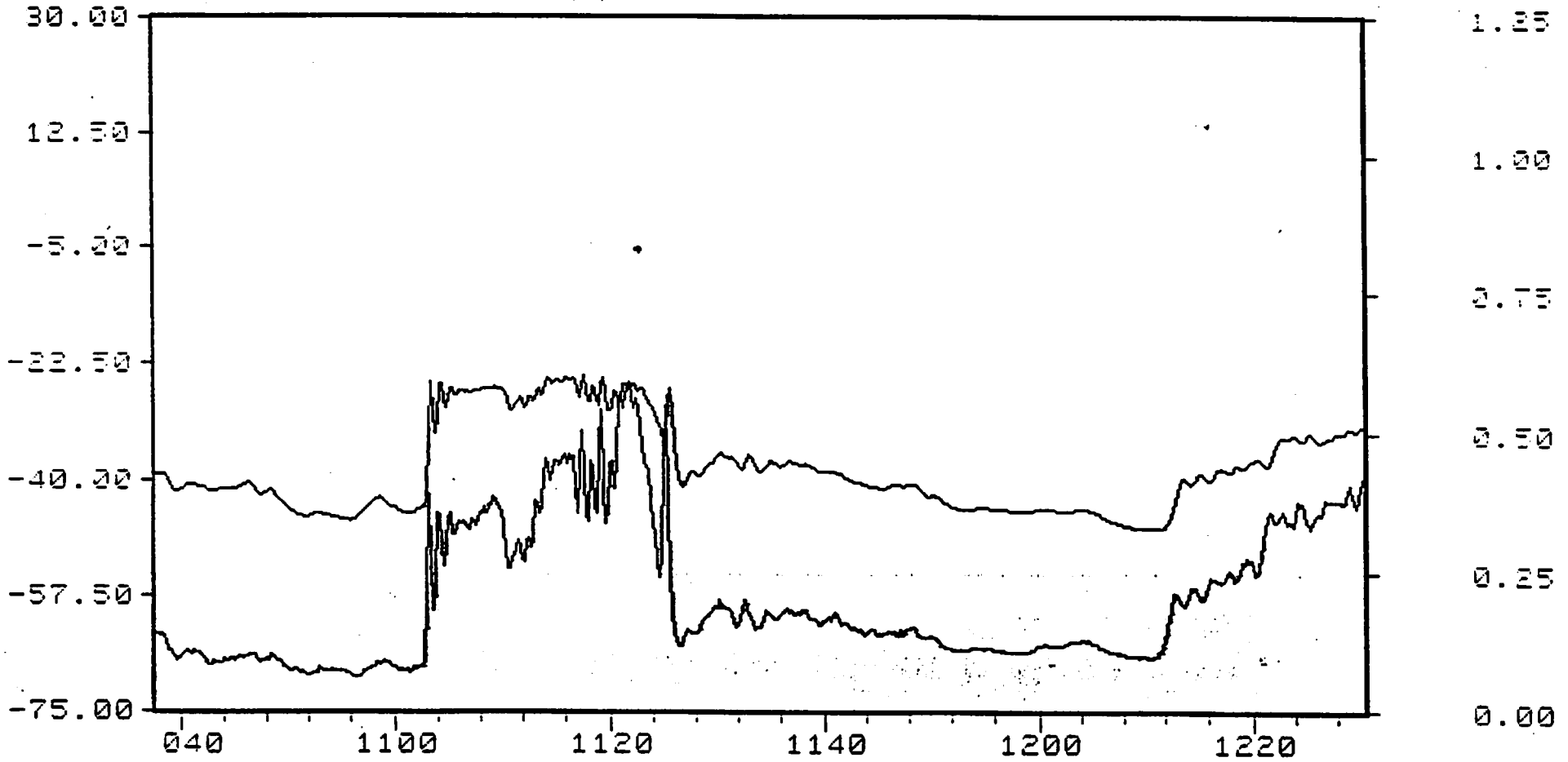
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

R8

A533 05-APR-97 12:30:18 030 Ω 45.88 -20.51 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
195.	465.	20.0	307.	-19.7	-32.0	118/10

GE DEWP C -32.04 MOD 1202 sec 0.43

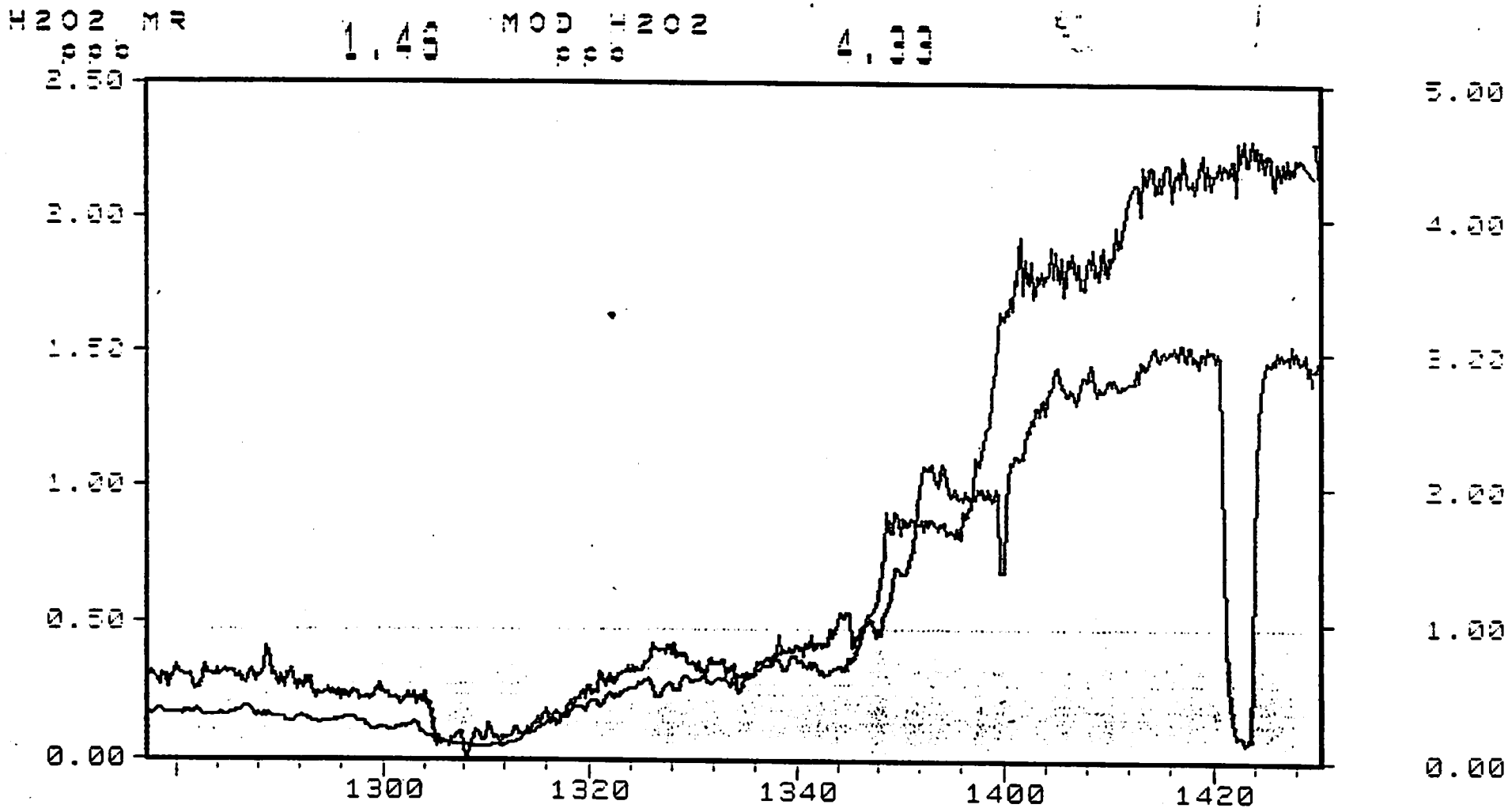


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

P3↓

A533 05-APR-97 14:30:00 039 Ω 37.79 -25.48 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
230.	817.	5.9	200.	9.3	-1.9	104/ 8

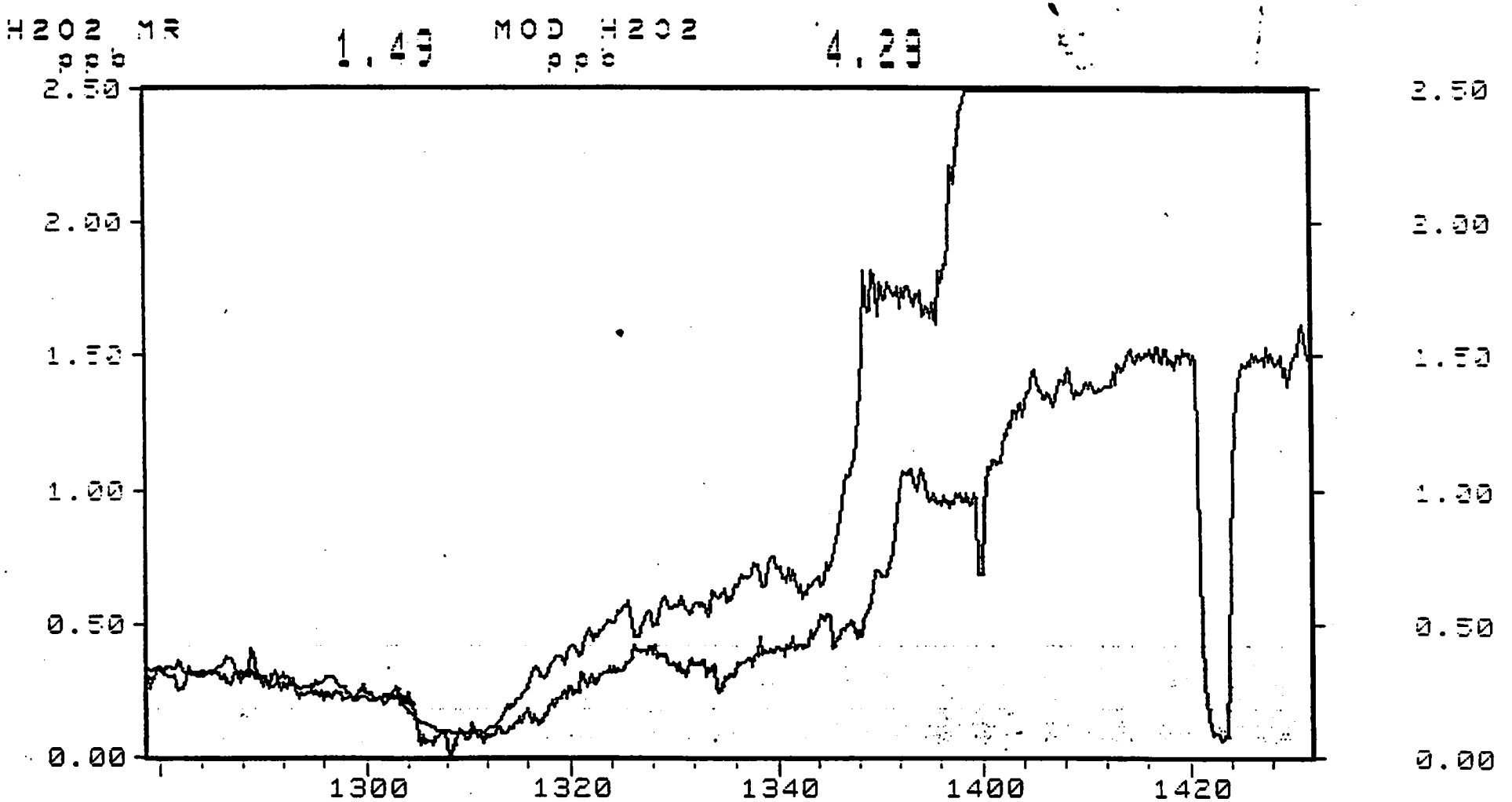


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

P31

A533 05-APR-97 14:31:54 039 Ω 37.72 -25.59 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
226.	816.	5.9	193.	9.5	-2.1	107/ 8



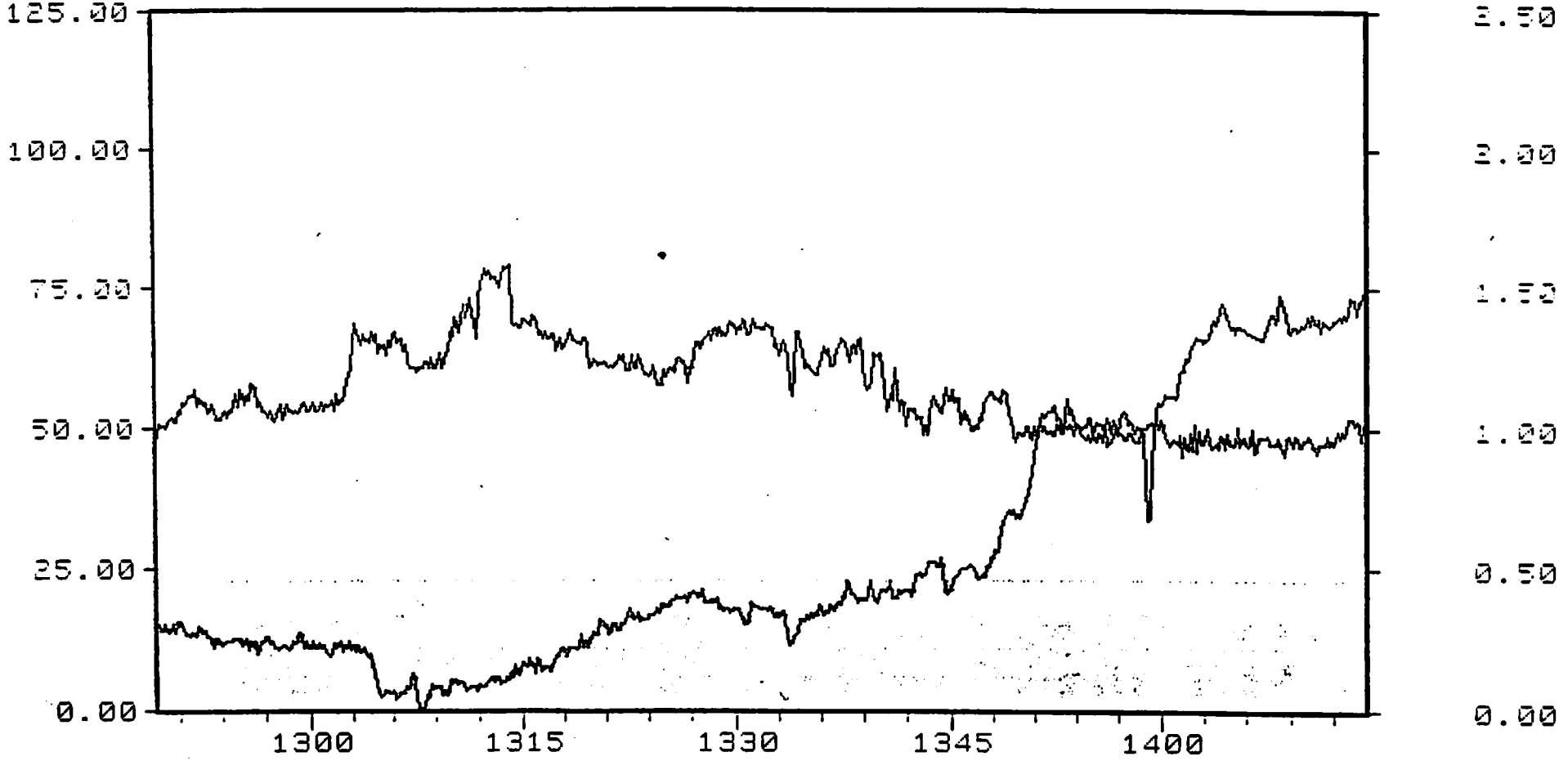
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

P3↓ (starts 13.45)

A533 05-APR-97 14:14:09 038 Ω 38.45 -24.66 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
218.	818.	5.8	196.	9.2	-2.0	085/ 9	

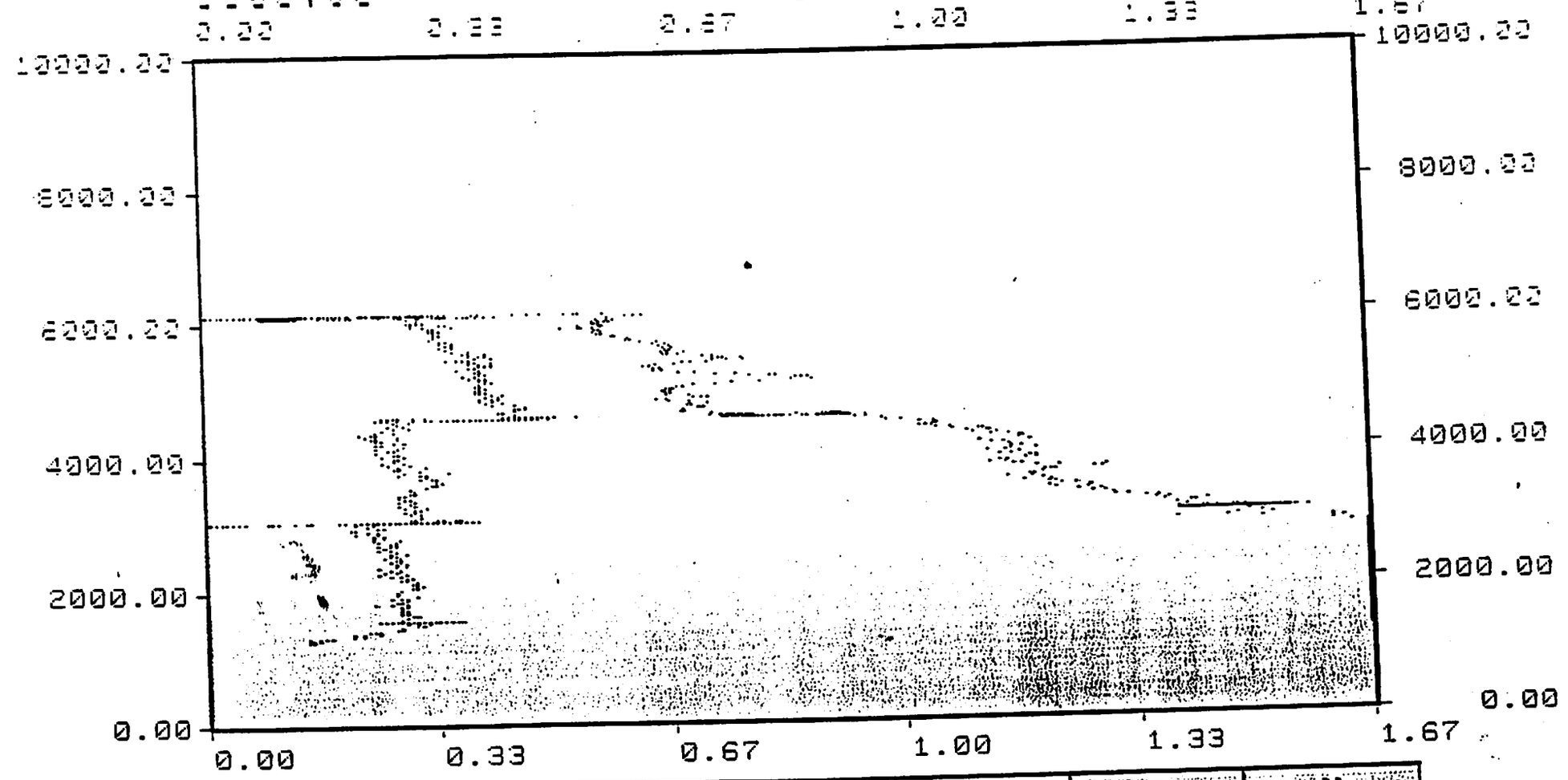
OZONE MR ppb 51.72 H2O2 MR ppb 1.50



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A533 05-APR-97 10:45:36 030 Ω 53.67 -15.89 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
211.	465.	20.0	303.	-20.1	-41.1	273/30	



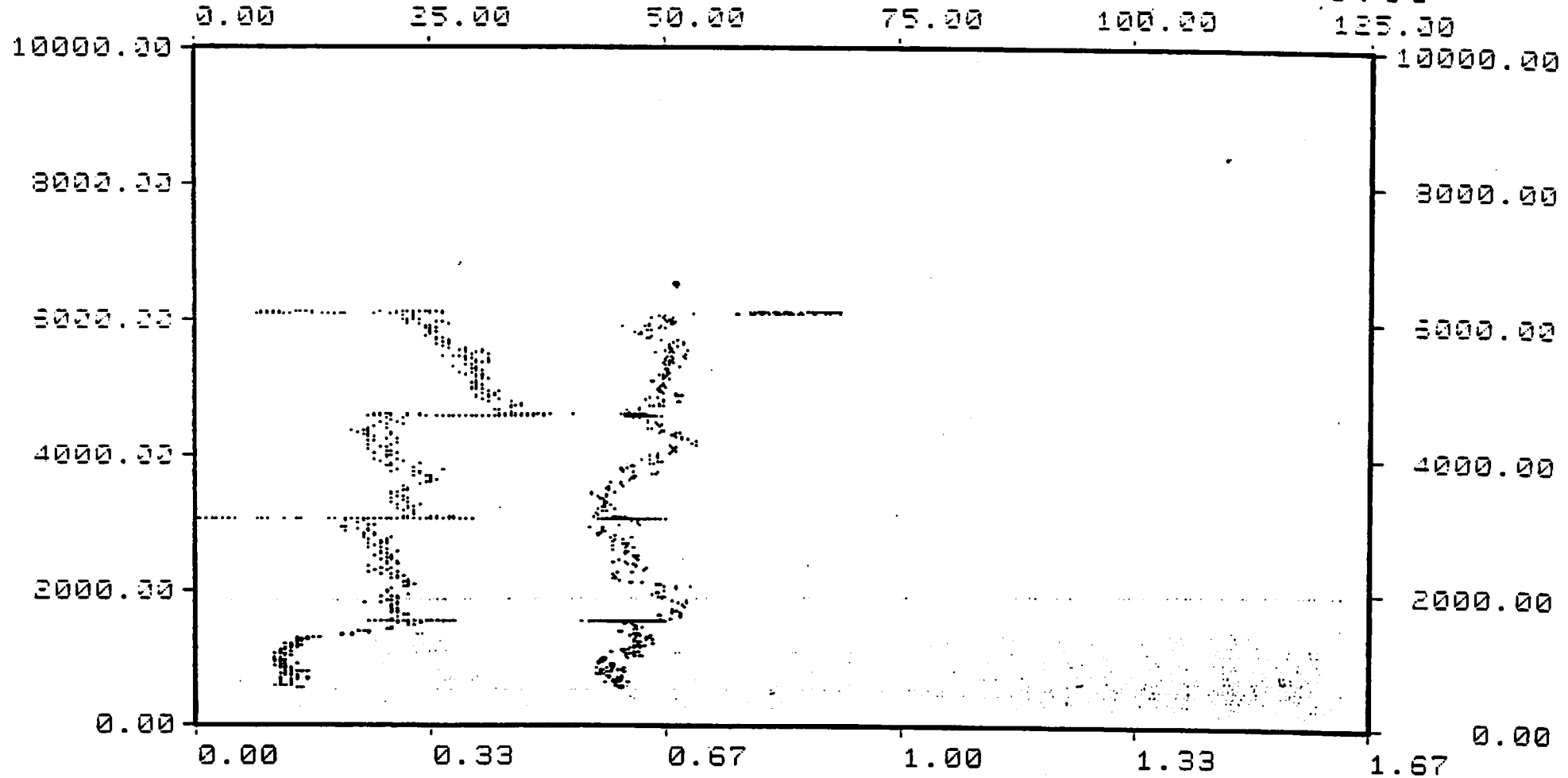
A	B	C	D	E	F	G	H
SELECT	CHEM	ZOOM				VIDEO	

P27 09:37 → 10:20

A533 05-APR-97 10:30:39 029 Ω 54.74 -15.17 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
216.	466.	20.0	292.	-19.8	-40.1	276/34	

PRES HGT 6089.77 m OZONE MR 59.75 ppb H2O2.MR 0.13 ppb

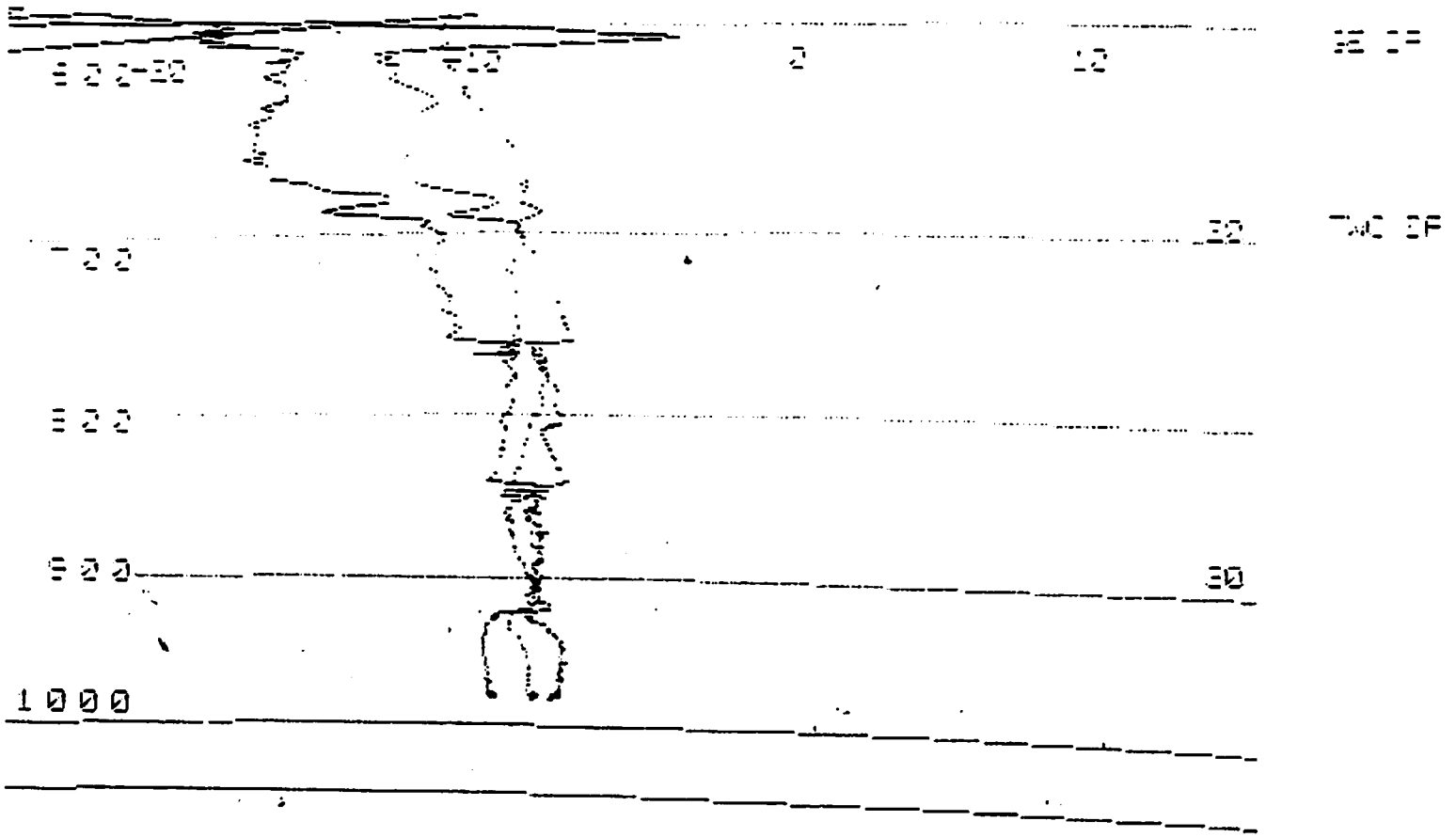


A SELECT	B CHEM	C ZOOM	D	E	F	G VIDEO	H

P1

A533 05-APR-97 09:31:36 020 55.89 -10.76 AS P

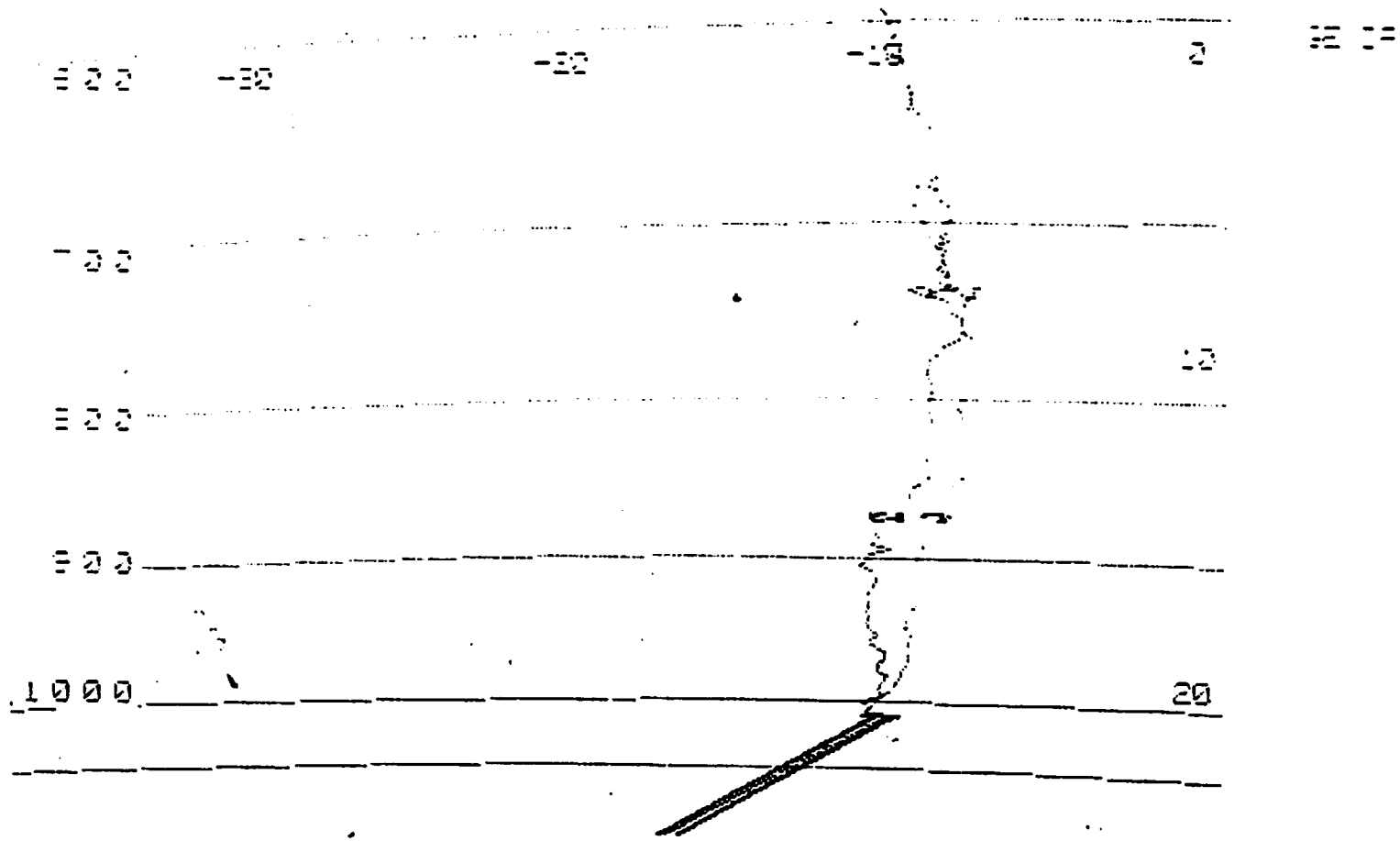
						WIND
261.	979.	1.0	181.	8.5	9.9	282/21



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A533 05-APR-97 08:50:30 015 55.75 -7.53 AS P

291.	549.	16.0	220.	-14.7	-25.3	293/33

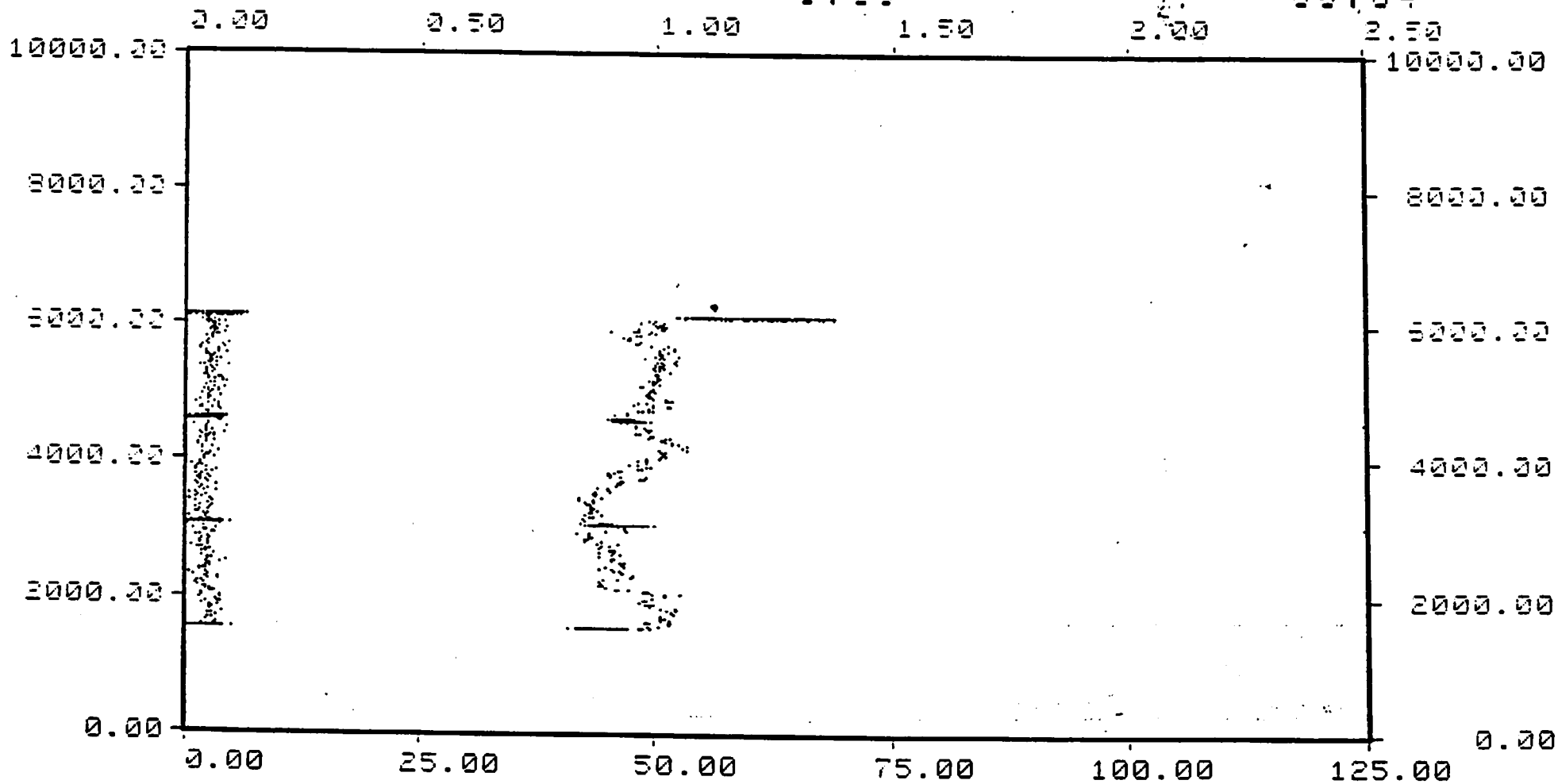


A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

A533 05-APR-97 10:38:15 029 Ω 54.20 -15.53 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
212.	465.	20.0	304.	-20.3	-39.2	270/31	

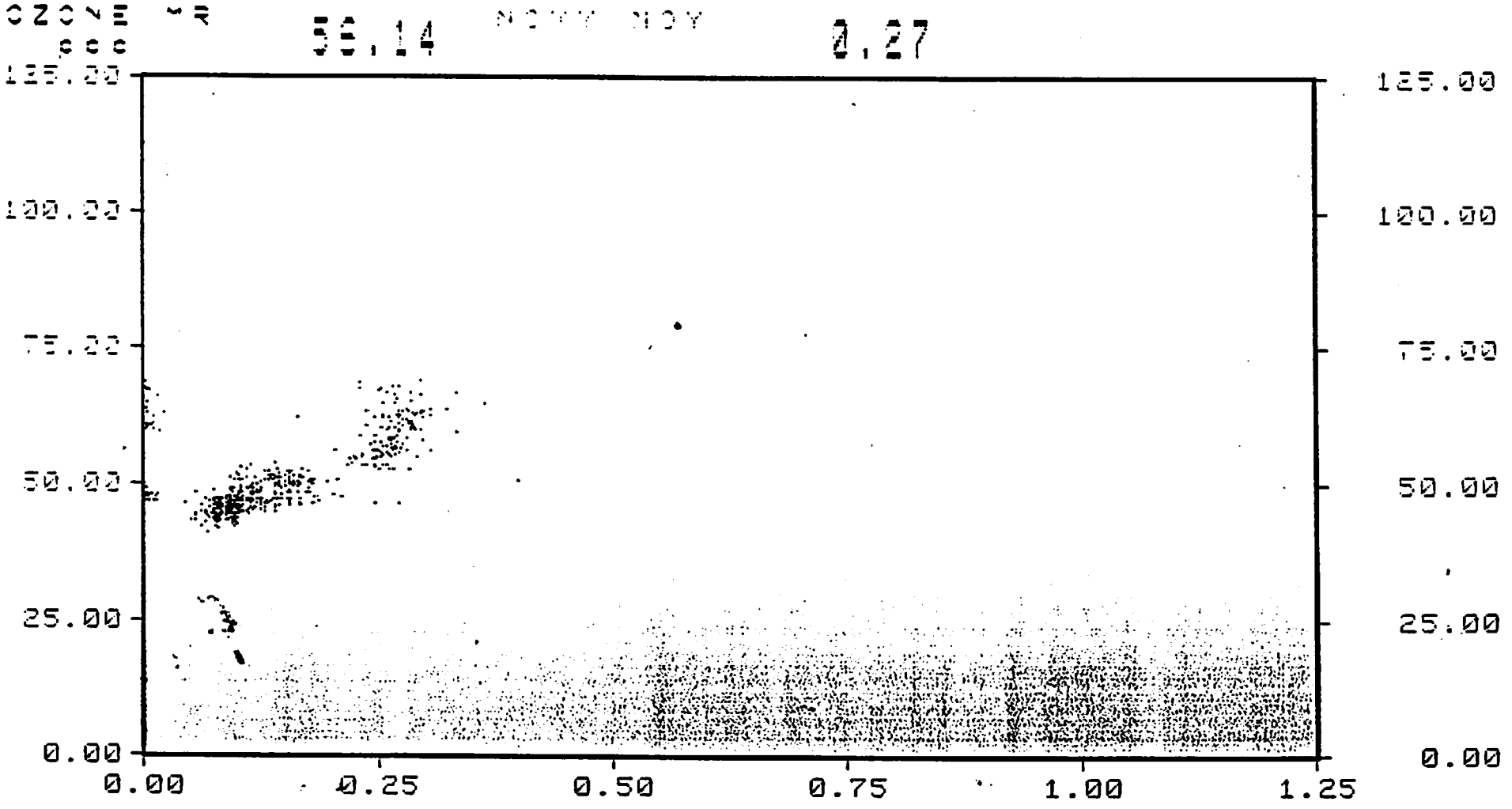
PRES HGT 5103.35 m NOXY NOY 0.09 OZONE MR 30.84 ppb



A SELECT	B CHEM	C ZOOM	D	E	F	G VIDEO	H

A533 05-APR-97 10:41:09 029 Ω 53.99 -15.67 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s
211.	465.	20.0	300.	-20.0	-40.9	273/29



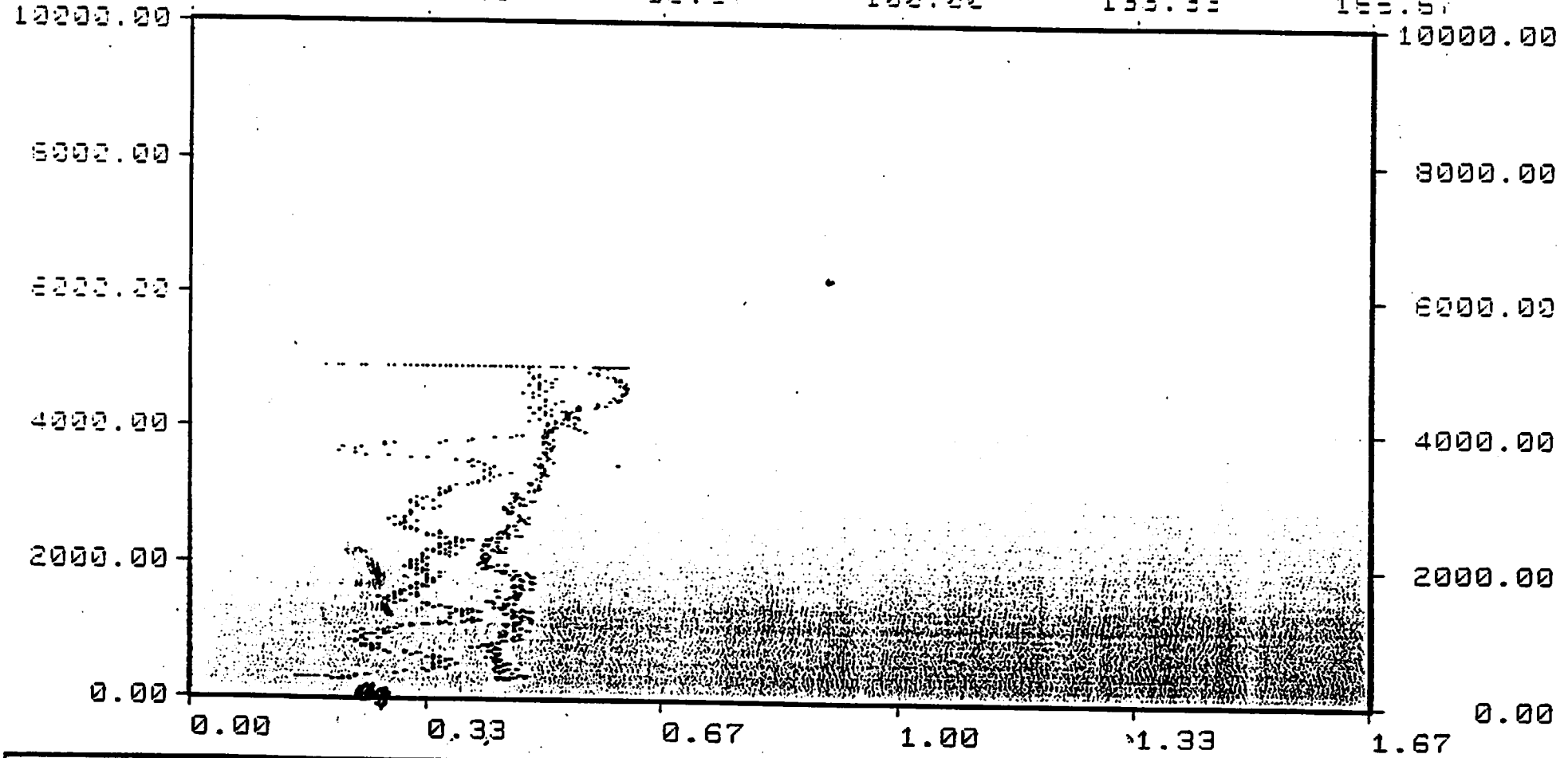
A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

07:08 → 07:3f (P1P)

A533 05-APR-97 09:28:30 020 Ω 55.92 -10.54 RV P

HDG degT	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
259.	978.	1.0	182.	8.4	9.9	283/19	

FREE ALT 291.98 m OZONE MF 45.99 ppb H2O2 MF 0.16 ppb

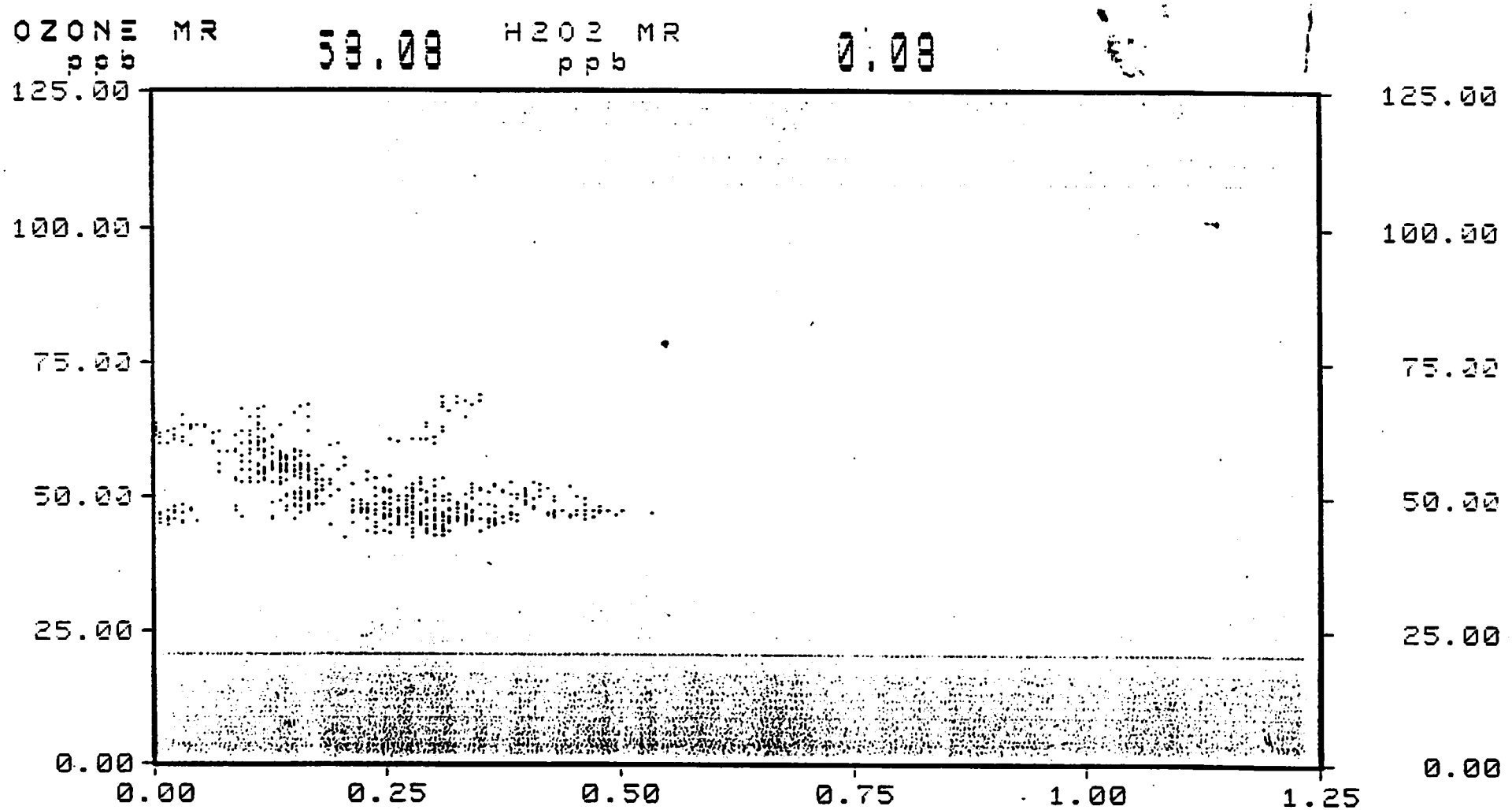


A	B	C	D	E	F	G	H
SELECT	CHEM	ZOOM				VIDEO	

P2 ↑ → 10:20

A533 05-APR-97 10:53:48 030 Ω 53:08 -16.28 RV P

HDG deg T	SPR mb	PHGT kft	TAS knots	TAT C	DEW C	WIND deg m/s	
211.	465.	20.0	301.	-18.7	-45.7	266/27	



A	B	C	D	E	F	G	H
SELECT	PARAS	FREQ	ZOOM			VIDEO	HELP

INPUT WEIGHT & FUEL SUMMARY — Computed for Met Research Flight by C F P

Max TOW = 155000 lbs Max LW = 135000 lbs
ZFW = 98000 lbs
Ramp Fuel = 54000 lbs
Start/Taxy = 5400 lbs
Min Div = 3000 lbs
Overhead = 5500 lbs
Hold FF = 4500 lbs
Contingency = 5 %
Extra Fuel = 0 lbs

Weather:

Dep: EGPK	Elev:00066'	Des: LPAZ	Elev:00308'
R/W: OAT:	QNH :	R/W: OAT:	QNH :
W/V:	QFE :	W/V:	QFE :
Wx :	SALT:	Wx :	SALT:
Cloud:		Cloud:	

Hercules-W2 ODM Computed.CCP. VNO 1

From EGPK To LPAZ | C/S | Crew | Date 04 04 97

ATC

WPT	Lvl	W/V	ISA	TkT	TkM	Dr	TAS	GrS	DIS	EET	ETA	ATA	TET	FU	Rmg	FF(k)	DTG
EGPK															48600		1536
PW	ASC	C-50	+3	304	311	+0	190	140	4	2			0.02				1532
LOITER	ASC	C-50	+3	000	007	+0	190	140	0	0			0.02				1532
TOC	ASC	C-50	+3	281	288	+0	190	140	19	8			0.10	1275	47325	7.7	1513
56N10W	120	C-50	+3	281	288	+0	307	257	163	38			1.50	4193	43132	6.6	1350
55N15W	200	C-20	+3	253	263	+0	309	289	180	37			1.25	3411	39721	5.5	1170
50N18W	200	C-20	+3	201	212	+0	311	291	319	66			2.31	6022	33699	5.5	851
45N21W	200	C-20	+3	203	214	+0	314	294	324	66			3.37	6087	27612	5.5	527
40N23W	200	C-10	+3	201	212	+0	317	307	256	50			4.27	4606	23006	5.5	271
LOITER										2			4.29	167	22839	5.0	271
DELTAR	200	C-10	+3	195	206	+0	318	308	200	39			5.08	3587	19252	5.5	71
VSM	120	C-10	+3	227	238	+0	314	304	71	14			5.22	1544	17708	6.6	0
LPAZ	120	C-10	+3	000	012	+0	314	304	0	0			5.22	0	17708	6.6	0
Diversion								Totals	1536	322							
LPLA	270	C-10	+3	320	332				141	37				3032	14676		

FUEL SUMMARY lbs

Start/Taxy	: 5400	T/O Fuel	: 48600		
Plan Fuel	: 30892	Plan Fuel	: 30892		
Diversion	: 3032	Actu Reserve	: 17708	ZFW	: 98000
Min Overhead	: 5500	Hold Fuel Fl	: 4500	Ramp Fu	: 54000
Contingency	: 1545	Rsv Endurance	: 3.56	Ram Weight	: 152000
Extra Fuel	: 0	Flt Plan Time	5.22	Take Off Weight	: 146600
Reqd Start Fuel	: 46369	Total Endurance	9.18	Landing Weight	: 115708

WEIGHT SUMMARY lbs

(c) RJCV 1991

WAYPOINTS

EGPK	00066'	N5530.2	W00434.5	1
PW	426.00	N5532.7	W00440.9	
56N10W		N5 .0	W01000.0	2
55N15W		N55 0.0	W01500.0	3
50N18W		N5 0	W018 0.0	4
45N21W		N4 0	W02 0.0	5
40N23W		N40 0	W02 0.0	6
DELTAR		N3 0	W02405.0	7
VSM	113.70	N3657.7	02510.0	
LPAZ	00308'	N3658	2510.7	8
LPLA	00180'	N3845	W02705.5	9

OBSERVATIONS

NOxy Instrument *Pre-Flight* Log Sheet

Flight No: A533 Date: 5TH APRIL '97 Page: 1 / 1

Campaign: OXICOA/AZORES Operator(s): TIM GREEN.

Time (GMT)	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments
04 41						COOLERS FULL - SYSTEM 'ON'
0457		164	332	200	100	BKGD COUNTS FOR PMT'S
05.01		959	3168	16133	7792	OZONIZERS 'ON' PMT'S COUNT.
05.08						INLETS REACHED ~600°C
05.36		539	2306	17698	32903	BKGD COUNTS PMT'S STABLE
06.39	SNOOPER #1 @ CAL.	801	15000	/	/	? LOOKED OK TO ME
		48000	1854	/	/	?
06.50.	SNOOPER #2 @ CAL	1200	68500			
		53700	570.			
0606	CO LB content gauge @ ~				550	psig (↔ NISL)
0612						NOy converters down to 300°C (x for
0618	WARMUP	on SNOOPER #1				(sequenced) aborted
0620	CAL	(manual)				on NO & NO2 snooper #1
0624	WARMUP	sequence on snooper		#1		
0642	CAL	46800	49500	—		NO→ SENS. = 7.7 cnts/ppt
	ZERO	700	1800			NO2 SENS. = 8.0 cnts/ppt
0647	CAL	———	———	41800	32800	NOy1 SENS = 6.8 cnts/ppt
	ZERO	———	———	1100	680	NOy2 SENS = 6.1 cnts/ppt
0651	all manual CAL			off		
0652	warm-up sequences			off		
0657	WARM-UP sequences on				without	CAL to check artifacts
	MEAS.	450	2100	1850	1200	NO artif. 3 ppt✓ OK
	ZERO	430	1750	800	650	NO2 artif = 44 ppt✓ OK
						NOy1 artif = 16? ppt✓ → MORE GAIN?
						NOy2 artif = 90 ppt✓ GOOD
0710	ran out of GND ZA			→ switch to A/C ZA tank → slight		
	contamination @ inlet					
	warm-up sequences off.					
0729	inlet heaters on → slight rise of NOy2 cnts					
0732	O3 HV off preparing for shutdown to power saver					
0737	System ready for power saver (all gases off + vac off)					
0748	start of OTC (Gas Turbine Compressor) on A/C					
0753	GND A/C engines started → power saver					

1 ppb = 550 psig [NO]

Note: All times logged as GMT

Delivery Gases (Gnd-A/C) Change Over Time: 0710

Power Change Over Time: 0753

Can Flush On: N/A

NB not used to save ZA.

NOxy Instrument *In-Flight* Log Sheet

Flight No: A533 Date: 5/4/97 Page: 1 / 4

Campaign: ACCE / TROPE Operator(s): Ranville / Green

Take-Off Time: 0809 Can Flush Off: N/A

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
0800	GND	NOxy ready for T/O.						
		7min required for stabilizing NOxy after power switch on.						
0803	ARTIF	started sequenced.						
		check made for ~ 0809 on NOy cnts						
0814		1st 2 'measure' on NOy artifact show spikes → return to or electronic noise						
081412	4000						start of Run 1	
→ caused during T/O → might be due to leak @ 130 took off								
night behind 737 → back of NOxy							(AN Flush was off	
081917							end of Run 1	
0818	→ NOxy on ambient air							
082330	8500						start of Run 2	
082503	8500						end of Run 2	
083149	16000						start of Run 3	
0838	start of	NO2 & NO cal					not sequenced → ~18min	
085854	16000						end of Run 3	
0855 → latest ZERO (for NO channel)								
0906	16000	ZERO	350	1402	700	420	not sequenced.	Z
0907	16000	ZERO OFF						
090826	16000 ↓						start of profile 1	
0923	ambient	conversions for NOy1: 0.4V → ~ 760ppt						
		NOy2: 0.1V ~ 260ppt						
092800	1000						end of P1	
092818	1000						start of Run 4	
0928	1000	ZERO	350	1200	600	350	not sequenced	Z
							end of Run 4	
093717	↑5000						start of P2.1	
094441	5000						start of Run 5	
0945	5000	ZERO	300	1350	570	350	not sequenced	Z
095152	5000						end of Run 5	
	↑10000						start of P2.2	

Note: All times logged as GMT

NOXY PARAMETERS ON LEFT ACE

NO → 630
NO_2 → 631
NOy 1 → 632
NOy 2 → 633

NOxy Instrument *In-Flight* Log Sheet

Flight No: A533 Date: 5/4/97 Page: 2/4

Campaign: ACSOE/AZORES Operator(s): Baugnitte

Take-Off Time: 0809 Can Flush Off: N/A

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
095650	10000						end of P 2.1	
0957	10000	ZERO not sequenced	310	1400	600	340	start of Run 6.1 / end of R6.1	2
1003							start of R6.2	
101010	↑ 15000						end of R6.2 / start of P 2.3	
NB: for last 4 zeros (Z), shutter of NO_2 box open 4 off								
101513	15000						end of P3.1 start of R7	
101545	15000	ZERO	370	1380	650	380	not sequenced, w shutter off.	2'
102012	↑ 20000						end of R7 & start of P 2.4	
102627	20000						start of R.8	
1027	20000	ZERO	400	1500	800	440	not sequenced, shutter off	2'
NB: for last 6 not used - zeros (Z & Z'), bypass on O_3 box								
1038	A/C now @ 20,000'		@ 300 kts				speed transitioning to 170 kts	
1041	20000	ZERO	450	1450	800	450	using new sequence Z	2
NB: new zero sequence is for 1 min 30 sec. Sequence includes bypass								
104357							end of Run 8	
1045	NO_2 box Press @ 286 Torr							
1102	20000	ZERO					sequenced (irrepeat time set @ 15 min)	
1117	20000	zero			700	350	sequenced	

$V = [(\text{Raw cnts} - \text{zero cnts}) / \text{SENS}] / \text{SCFACT}$

ppbV

ppbV

2000 V

Note: All times logged as GMT

O_3 on HORACE → 574

TOTAL HNO_3 CONTENT

572 591

DENUDER TUBE

NOxy Instrument *In-Flight* Log Sheet

Flight No: A533 Date: 5/4/97 Page: 3.4

Campaign: ACSOE/AZORES Operator(s): Baumgardner

Take-Off Time: 0809 Can Flush Off: N/A

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
12 17	20000	ZERO	450	1400	550	310	sequenced	
12 21	20000	NO output to DRS w zero value above + 2.5V/cnts as scaling factor.						
12 29		~~NO2 output to DRS set @~~					NOx 1!	
12 44	NB	NOy 1 on HORACE is actually NO_2 from NOy						
		NO (NO_{xy}) displayed @ approx. 100 pptv for 1V						
		NO_2 (NO_{xy}) displayed @ approx. 500 pptv for 1V						
1250		NO_y 1 (NO_{xy}) 1000 pptv for 1V						
		NO_y 2 (NO_{xy}) 1000 pptv for 1V						
13 24 41	20000	CAL					start of R9	
1328	20000	CAL	(NO_2 cal + NO cal on 6 dumps)				not sequenced, still pb w/ end of R9 NO_y 1 cal.	
13 44 33	20000							
13 45 23	↓						start of P3.1	
last zero stack	@	1342	→ not sequenced zero for next					
~~13 50 06~~	15000	end of P3.1 / start of Run 10						
13 50 06								
13 56 46	↓	end of R10 / start of P3.2						
1401	10000	ZERO	350	1200	450	230	sequenced	
14 10 35	10000	start of R11 / end of P3.2						
14 08 54	↓	end of R11 / start of P3.3						
New zero	values fed to computers for DFS							
1412	6000	end of P3.3 / start of R12						
1417	6000	ZERO sequence accidentally run during R12 (during measurement) - R NB						
1421	6000	ZERO	390	1320	460	240	sequenced	
14 32 31	↓	end of Run 12 / start of P3.4						
14 35 19	3500	start of R13 / end of P3.4						
14 40 55	↓	end of Run 13 / start of P3.5						

Note: All times logged as GMT

NOxy Instrument *In-Flight* Log Sheet

Flight No: A533 Date: 5/14/97 Page: 4 / 4

Campaign: ACSOE / AZORES Operator(s): Bauguitte

Take-Off Time: 08/09 Can Flush Off: N/A

Note: Enter Sequence (SEQ.) as Calib, Zero, Artifact

Time (GMT)	Altitude	SEQ.	NO (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments	Run
1443	2000	below		cloud base				
144717	50						end of P3.5	
144822	100	ZERO	410	1300			start of R14 (sequenced zero)	
					480	250		
1457	100	ZA on for			ARTIFACT		(Manual override)	
1458	100	ARTIF seq on						
145804	100						end of R14	

Note: All times logged as GMT

NOxy Instrument *Post-Flight* Log Sheet

Flight No: A533 Date: 5/4/97 Page: 1 / 1

Campaign: ACJOE/ATOMS Operator(s): Baumville

Landing Time: 1509 Power Change Over Time: _____

Delivery Gases (A/C-Gnd) Change Over Time: N/A

Time (GMT)	SEQ.	NO. (cps)	NO2 (cps)	NOy 1 (cps)	NOy 2 (cps)	Comments
1507	CAN FLUSH			ON		
1511	CAN FLUSH			OFF		
1513	O3	HV	OFF			
Check Ozonizer #2 400 ft FAN ? OK						

Note: All times logged as GMT

Instrument Shutdown Time: 1517

Formaldehyde Instrument Log Sheet

Page: 1 / 6

Flight No: A533 Date: 5/6/97

Campaign: ACSOE - TRANSIT FLIGHT Operator(s): Mulsy.

Air Sampling Rate: 1.54 SLM Peristaltic Pump Speed: 3 (rpm)

PMT Sensitivity: 30 Calib Factor: ~~1mV = 7.6 ppbv.~~ (V to ppt) 409.5 drs Bits = 1V

Approx Lag Time: 8.5min Estimated React Coil Temp: 93°C

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
			CirLib. 1mV = 10.6 ppbv @ 1 SLM @ 3K
			1mV = 7.5 ppbv @ 1.5 SLM
			Pre-Flight.
06:41:25	Z	0.71	
06:45:25	A	0.69	End Zero - low noise but Zero higher than expected
061800			debubbler stopped working.
065400	Z	0.98	Started Zero.
070649	Z	0.68	lamp = 7.14V
071430	Z	0.67	
073862	Z	0.65	0.65 ppbV on Brians PC
074630	Z	0.64	
075400	Z	0.67.	Power transfer Complete
			left running on zero - During
			take off.
081310	Z	0.64	Climbing to 6000' (Safety altitude
081418	A	0.68	Start Run ① - Bad blip on Zero!
081917	A	0.86	End of Run ①, climbing to
082330	Z	0.68	Alt = 1.85 Run ② Start
082503	Z	0.70	Run ② aborted - Climbed to avoid Cloud.
082541	A	0.71	Turned off Zero
083646	Z	0.72	Start Run ② @ FL160 Scale rate
			= 0.77 SLM., Started Zero
084926	A	0.70	Set to Measure - zero is Noisy,
			high - even on ground. Airflow rate
			too low
085810	A	0.62	U low Signal Flow Air Flow = 0.80 SLM
085956	A	0.61	end Run ②

Engine Start 10 to hr.

15 min.

Formaldehyde Instrument Log Sheet

Flight No: A539 Date: 5/6/97 Page: 2 / 6

Campaign: _____ Operator(s): Mills

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
5904 20	Z	0.61/2	Start Zero.
0908 28	A	0.64	Start decent @ 1000' fpm.
			Start Profile ① from FL 160
091306	A	0.60	&
13:29	A		Flow @ 10000' = 1.14 SLM.
91531	A	0.60	8000' decending @ 500 fpm
0921:40	A	0.65	5000' + decending Flow = 1.53
07:2620	A	0.63	2000' + decending
092300	A		~~Start Run ⑥~~, End Profile ① 900'
092818	A	0.64	~~1000'~~ Start Run ⑥
093717	A	0.65	Climb to 5000' ~~End Run ⑥~~
			Start Profile 2.1 from 1000'
094446	A	0.63	Start Run ⑤, end profile
51	A		Flow = 1.69
095152	A	0.69	~~End Run ⑤~~ start profile ②
			to ~~flight~~ FL 100
095650	Z		Start run ⑥, end Profile
			@ 10000', Start Zero
10:0420	—		Changed = 1904cnts
10:0543	Z		end 6 Minute Zero. end 6.1
10:0545	A.		Commence 6.2
			Air Sample rate = 1.17
10:0937	A	0.67	≈ 0.85 ppbV on Brians PC.
10:10:12	A		climbing to 15000' end run 6.2
			start Profile 2.3
10:15:12	A	0.67	run ⑦ start at FL 150
			UNCERTAIN OF ZERO @ 5000'

Formaldehyde Instrument Log Sheet

Flight No: A537 Date: _____ Page: 5 / 6

Campaign: _____ Operator(s): _____

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
10:19:00	A	0.70	FL150 - Air Sample at 0.7 SLM
			End of Run (7) Climb + accelerate
10:20:12	A		For Transit.
10:22:54	A	0.80	12000' Sample rate = 0.81
10 26 27	A	0.70	end Profile start Run (8) - at
			high speed. Lamp = 7.06 V
			FL200, Sample = 0.71 SLM
10:31:10	Z	0.76	Start 10 r Min Zero
			~~Flow~~ = 0.68
10:43:37	A	0.72	End Run (8), end Zero
10:55:00	Z		START 25 MIN ZERO.
11:0107	Z	0.67	~ 6½ Mins into Zero
11:0705	Z	0.67/8	
11:13:03	A	0.68	- Period - 0.66 V Zero - reason ?
11:15:02	CABIN	0.68	~~Ambient~~ STARTED SAMPLING
			CABIN AIR @ 1.56 SLM.
			TO TEST INSTRUMENT WORKING.
11:19:48	ZERO (outside APF)	0.95	STARTED ZERO.
11:23:20	Z	0.70	
11:35:10	Z	0.66	0.5 PPBV on brians PC - Variation
			on Zero is ~~30~~ P 30mV Peak to Peak
			- Varies on time scale of 3-6 Mins
11:58:17	A		END ZERO - AMBIENT SAMPLING
			at.
11:46:10	Z		START ZERO - Checked ~~Valves~~ Flags
			in Box. Nothing Loose no obvious leaks.

Formaldehyde Instrument Log Sheet

Flight No: A532 Date: 5/6/97 Page: 4 / 6

Campaign: TRANSIT FLIGHTS Operator(s): _____

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
11:55:40	Z	0.55	Tightened some fittings U slightly
1:58:38	Z	0.54	-Poss air inlet on wet chem box leaked.)
11:58:46	A	0.56	END ZERO - START AMBIENT
			MEASURE
12:0635	A	0.58	- not showing on Brians PC (below Zero)
120817	A	0.58	
12:10:38	A	0.59	
12:12:10	A	0.59	LAMP = 703, FLOW = 0.71 SLM.
12:13:57	Z	0.58	START ZERO, FLOW = 0.64
			SPEED = 300 KNOTS. ~~HEAT~~ FL200
121435	A	0.59	
12:20:55	Z	0.57	
12:22:19	Z	0.56	Well below Zero on Brians PC
12:23:45	Z	0.57	
12:25:20	Z	0.56	
12:26:45	Z	0.55	
12:28:50	Z	0.55	
12:29:20	Z	0.54	
12:31:10	Z	0.53	
12:34:53	A	0.55	START MEASURE
12:36:25	A	0.55	
12:37:35	A	0.55	-0.35 ppbV on Laptop.
12:39:54	A	0.54	
12:43:00	A	0.56	
12:46:00	A	0.57	
12:47:39	A	0.58	
12:58:30	A	0.57	Flow 0.71, Lamp = 703
12:59:45	Z	0.57	Starting Zero
13:09:30	Z	0.56	

Formaldehyde Instrument Log Sheet

Flight No: ~~A533~~ 533 Date: 5/6/97 Page: 15 / 16

Campaign: ACSOE - Azores Trans Operator(s): _____

Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
13:04 55	Z	0.57	if Zero is working it goes down
			V. Slowly.
13:07 46	Z	0.54	} Zero is V. ~~Noisy~~ / not proper Zero.
13:10 00	Z	0.55	
13:11 10	Z	0.56	
13:14:11	Z	0.56	
13:18:04	Z	0.56	
13:24 41	Z	0.55	Run (9) @ fl 200 - Steph calib
13:31 20	A	0.55	END Zero. Start ambient Sampling
			Get Profile from Brian - 3.1
13:49:00	A	0.58	Flow = 0.86 SLM
13:50:06	A	0.58	FL150 end Profile (3)-1 Start Run 10
			flow = 0.91
13:55:00	A	0.57	
13:56 46	A	0.56	end Run 10 Start Profile 3.2
14:00:00	A	0.58	~~flow~~ Flow = 1.07 SLM
14:01 35		0.57	End Profile 3.2 Start Run 11
			fl 100
			flow = 1.17
14:03 45	A	0.57/8	
14:06 27	A	0.59	- gets above Zero on Brians PC
14:08 51	A	0.59	End Run 11, Start Profile 3.3 ~~to fl 100~~ for fl 100
			to 6000'
14:12 59	A		~~Start~~ End Profile 3.3, Start Run 12
			at fl 60
14:14:16	A	0.59	

Formaldehyde Instrument Log Sheet

Flight No: A5323 Date: 5/6/97 Page: 6 / 6

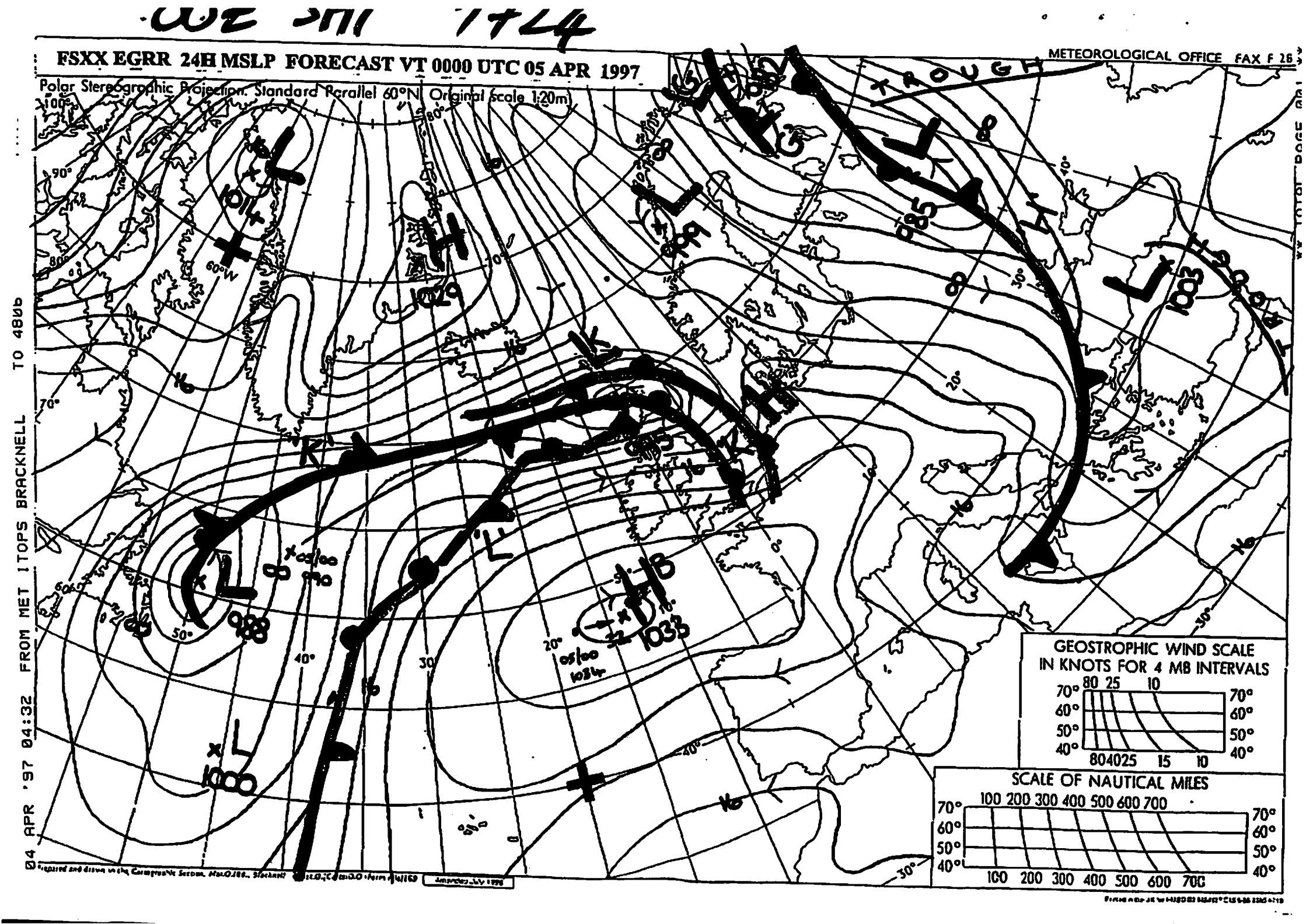
Campaign: Arsce - Azores Trans! Operator(s): _____

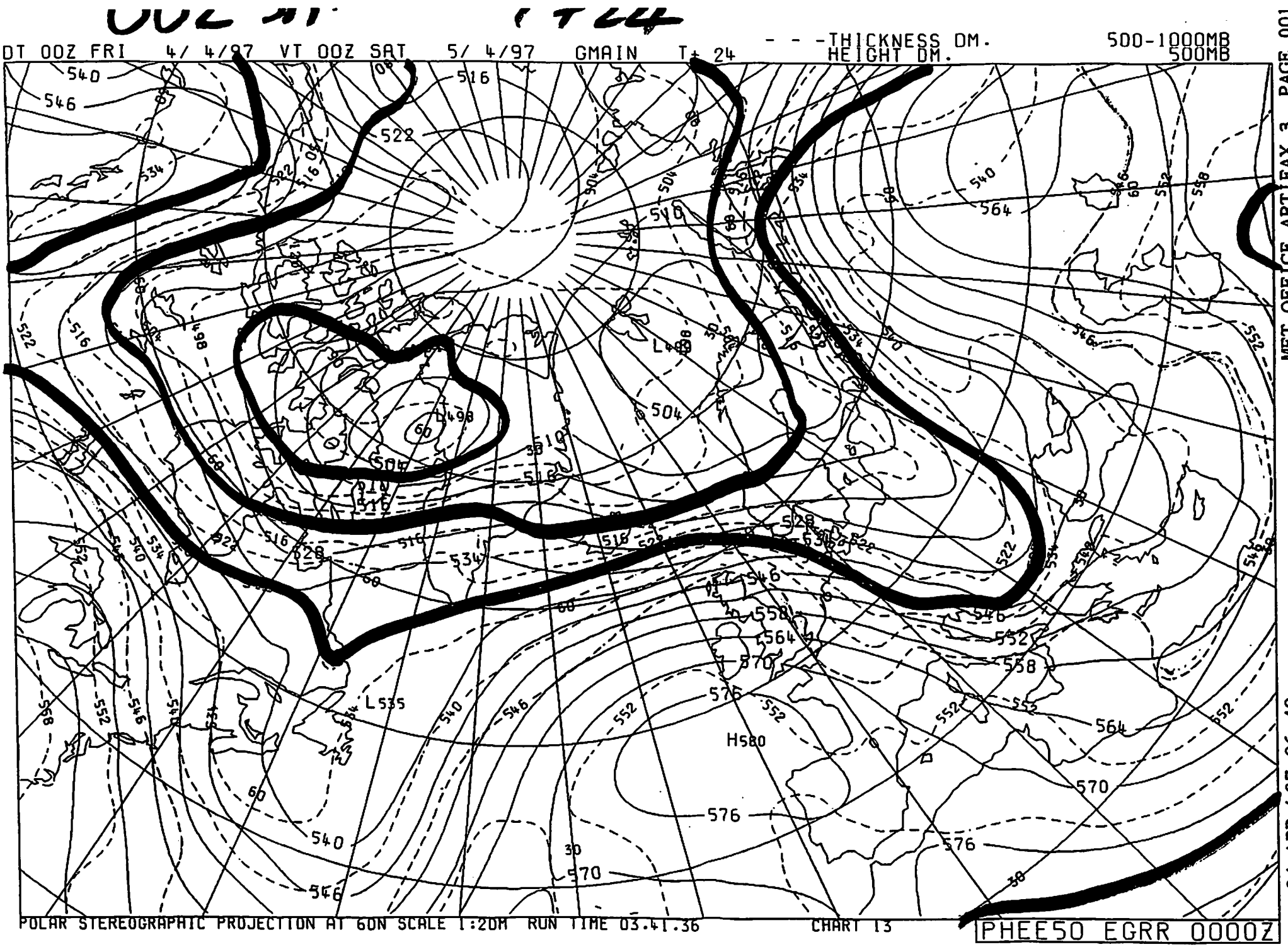
Air Sampling Rate: _____ Peristaltic Pump Speed: _____ (rpm)

PMT Sensitivity: _____ Calib Factor: _____ (V to ppt) _____ drs Bits = 1V

Approx Lag Time: _____ React Coil Temp: _____

Time (GMT)	Zero/Amb	Inst. Output (V)	Other Info/Remarks e.g. Altitude, lamp output, sampling rate changes etc.
14:17:40	A	0.61	
14:18:17	Z	0.62	Zero Started.
14:26:35	Z	0.56/5	
14:28:09	Z	0.55	
14:29:32	A	0.54	Zero finished Air flow = 1.42
			Hdg 170 + decend to 3500'
14:32:31	A	0.50	End Run (12), Start Profile 4
			End Profile (4) @ 3500'
14:35:19		0.62/3	Start Run (13)
			Profile @ 500' / Minute - end
14:40:55	A	0.65/6	Run 13, Start Profile 3-5
14:47:17			end profile 3-5 @ 50' then
			climbed to 200
14:49:22	A	0.65	START Run (14) @ 100'
			Lamp = 7.02, Supply rate = 1.55
14:56:47	A	0.66	START FINAL ZERO
14:59:06	Z		End Run (14)

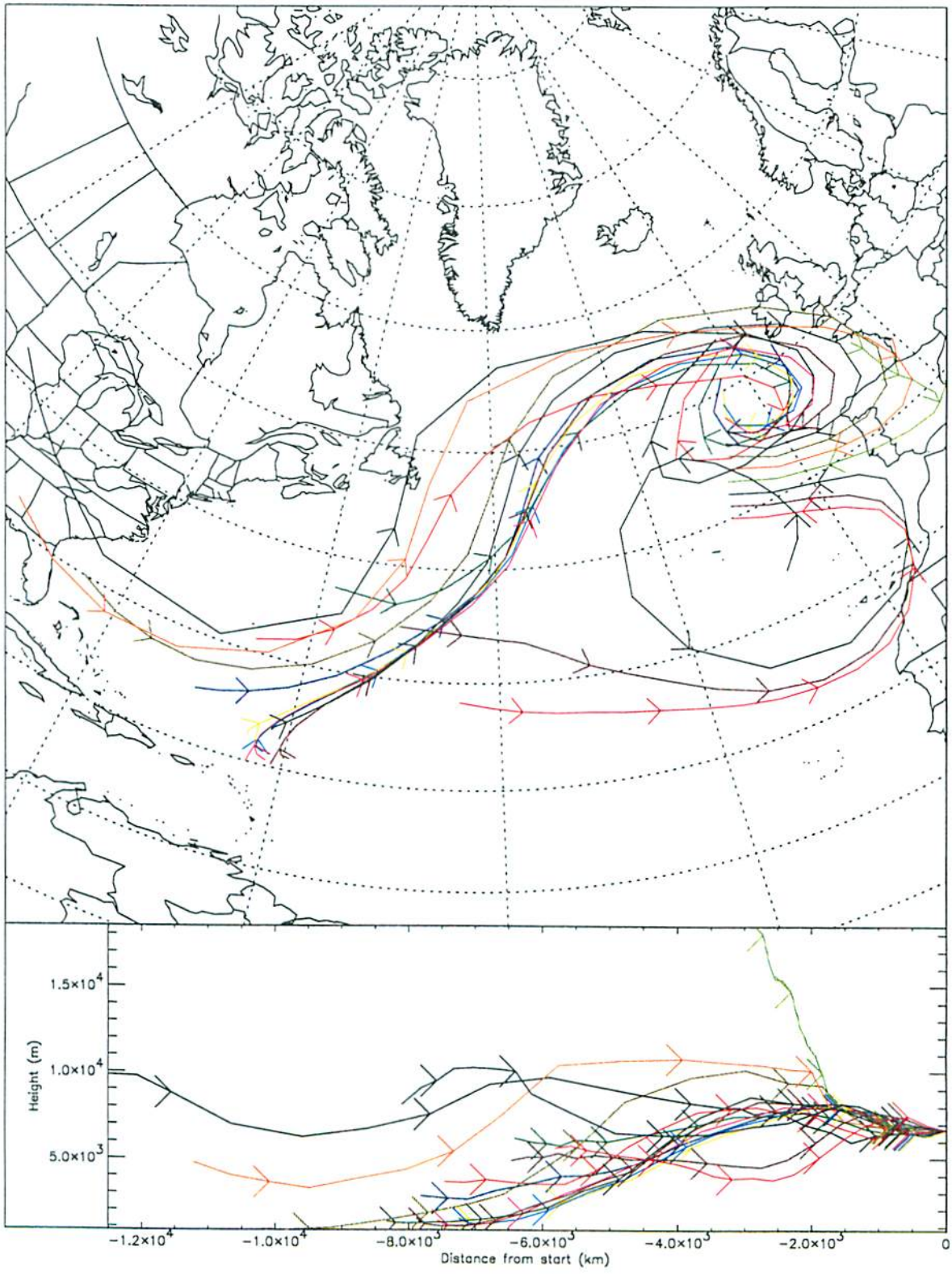

FSXX EGRR 24H MSLP FORECAST VT 0000 UTC 05 APR 1997
METEOROLOGICAL OFFICE FAX F 26
Polar Stereographic Projection. Standard Parallel 60°N. Original scale 1:20m
TROUGH
GEOSTROPHIC WIND SCALE
IN KNOTS FOR 4 MB INTERVALS
80 25 10
804025 15 10
SCALE OF NAUTICAL MILES
100 200 300 400 500 600 700
100 200 300 400 500 600 700
04 APR '97 04:32 FROM MET ITOPS BRACKNELL TO 4806


00Z 4/ +T24
DT 00Z FRI 4/ 4/97 VT 00Z SAT 5/ 4/97 GMAIN T+ 24
- - - -THICKNESS DM.
HEIGHT DM.
500-1000MB
500MB
MET_OFFICE_ARTIFAX_3 PAGE. 001
04 APR '97 06:40
L498
L535
H580
POLAR STEREOGRAPHIC PROJECTION AT 60N SCALE 1:20M RUN TIME 03.41.36
CHART 13
PHEE50 EGRR 0000Z

A533B.TXT

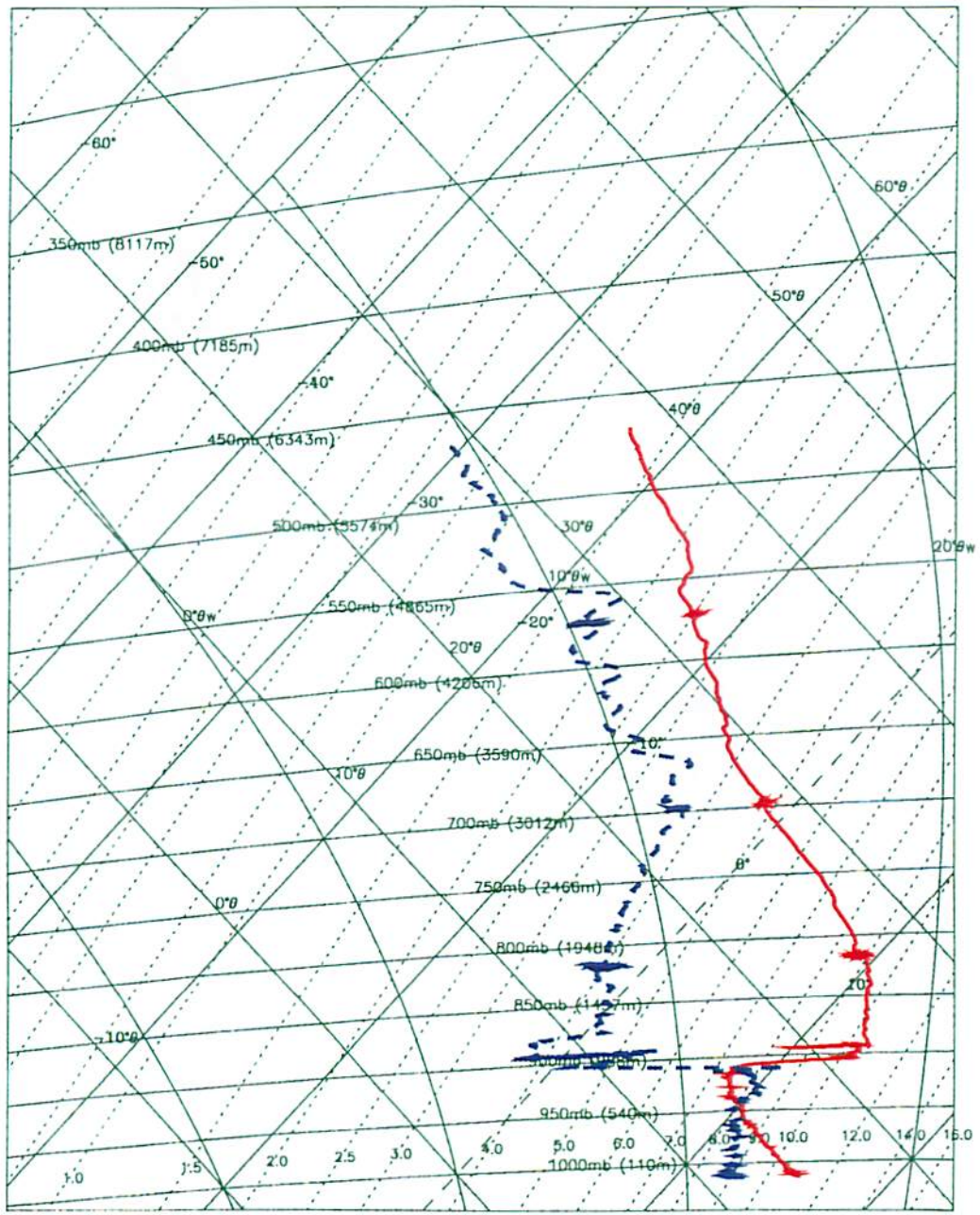
From 12Z 31/ 3/1997 to 12Z 5/ 4/1997

Arrows every 24 hrs



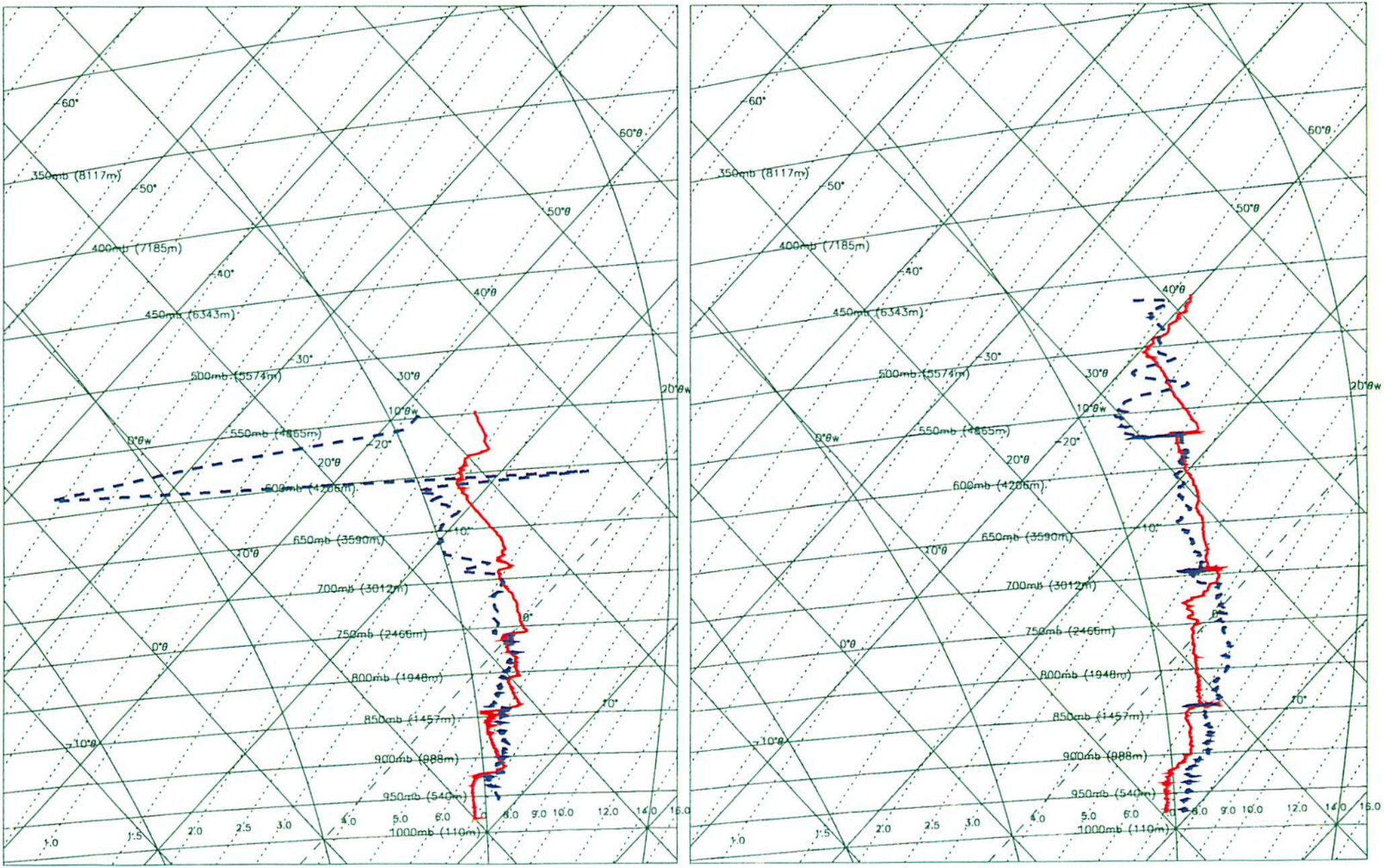
A533 05-APR-97

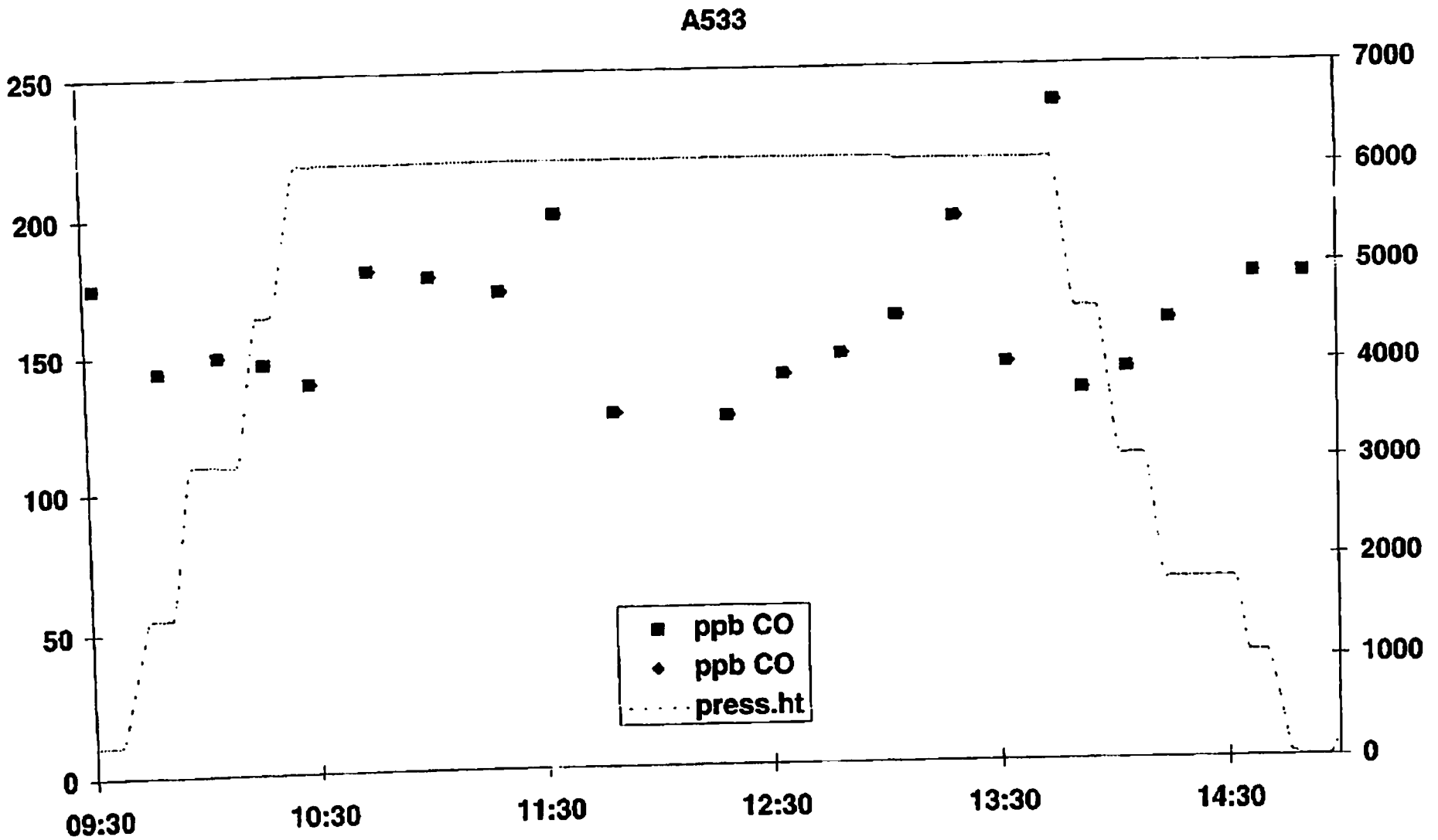
P3 FL200-50'(134523-144717)



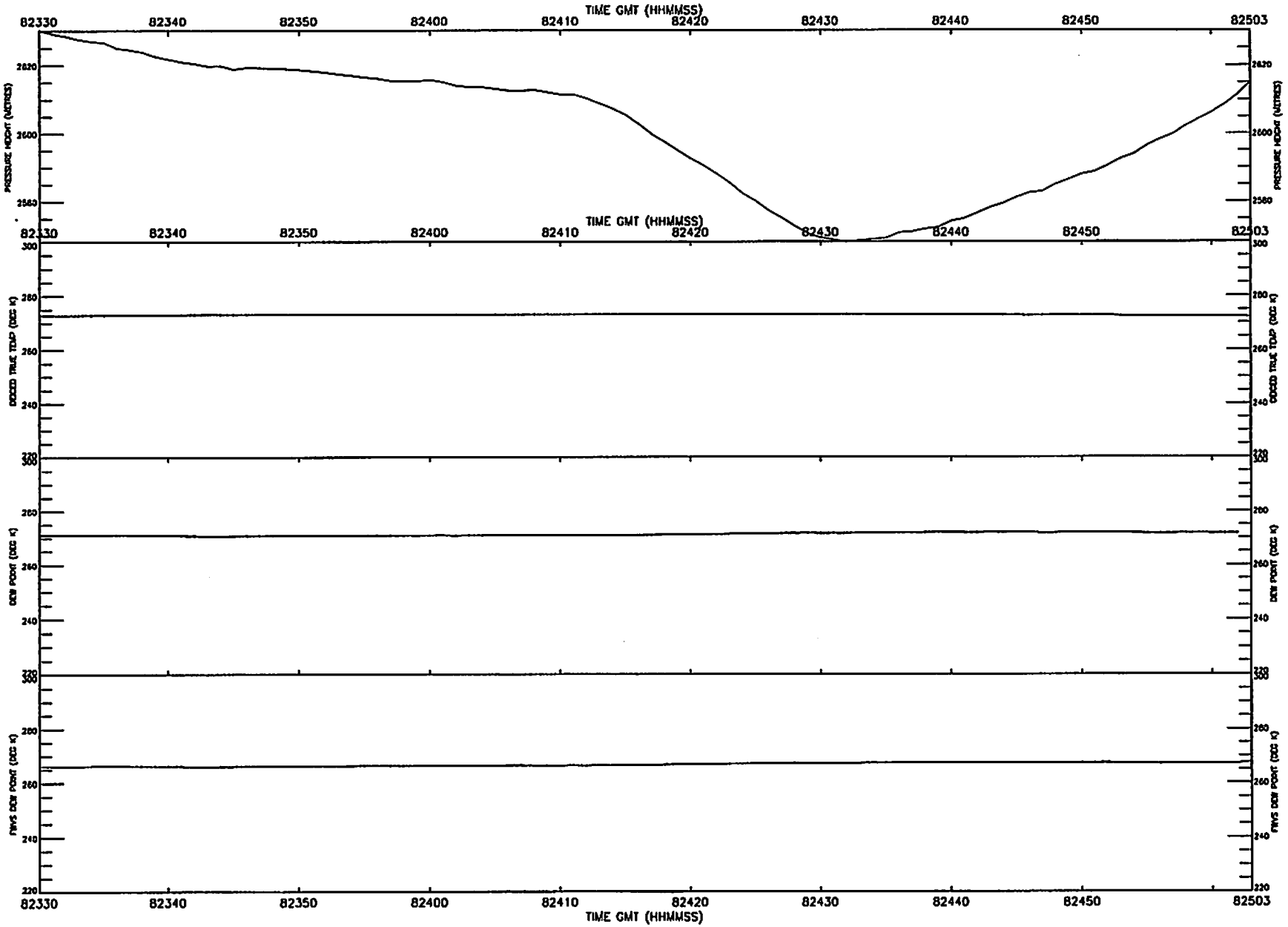
A533 05-APR-97

P1 FL160-900ft(90826-92800) + P2 1000'-FL200(93717-102627)

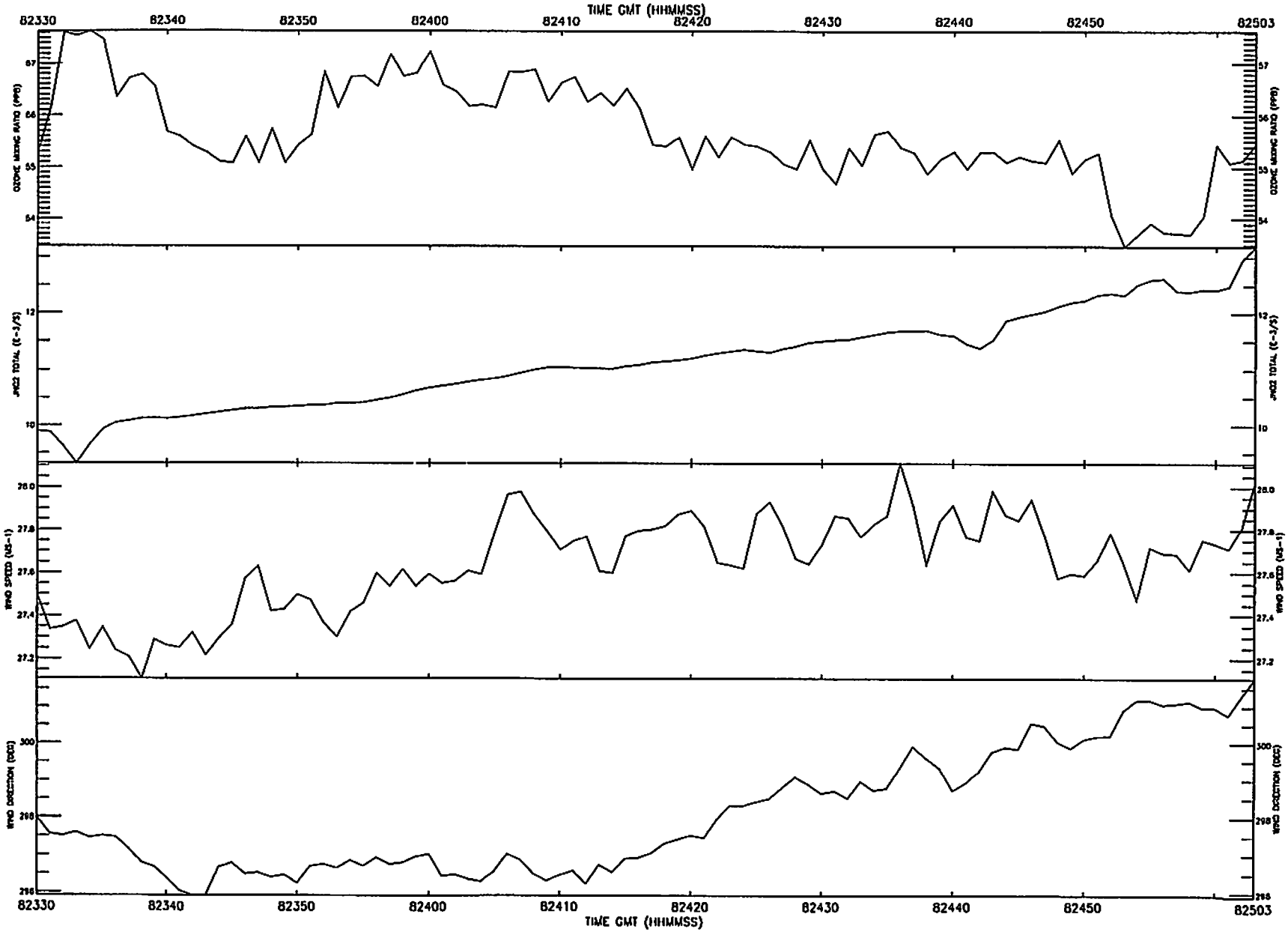




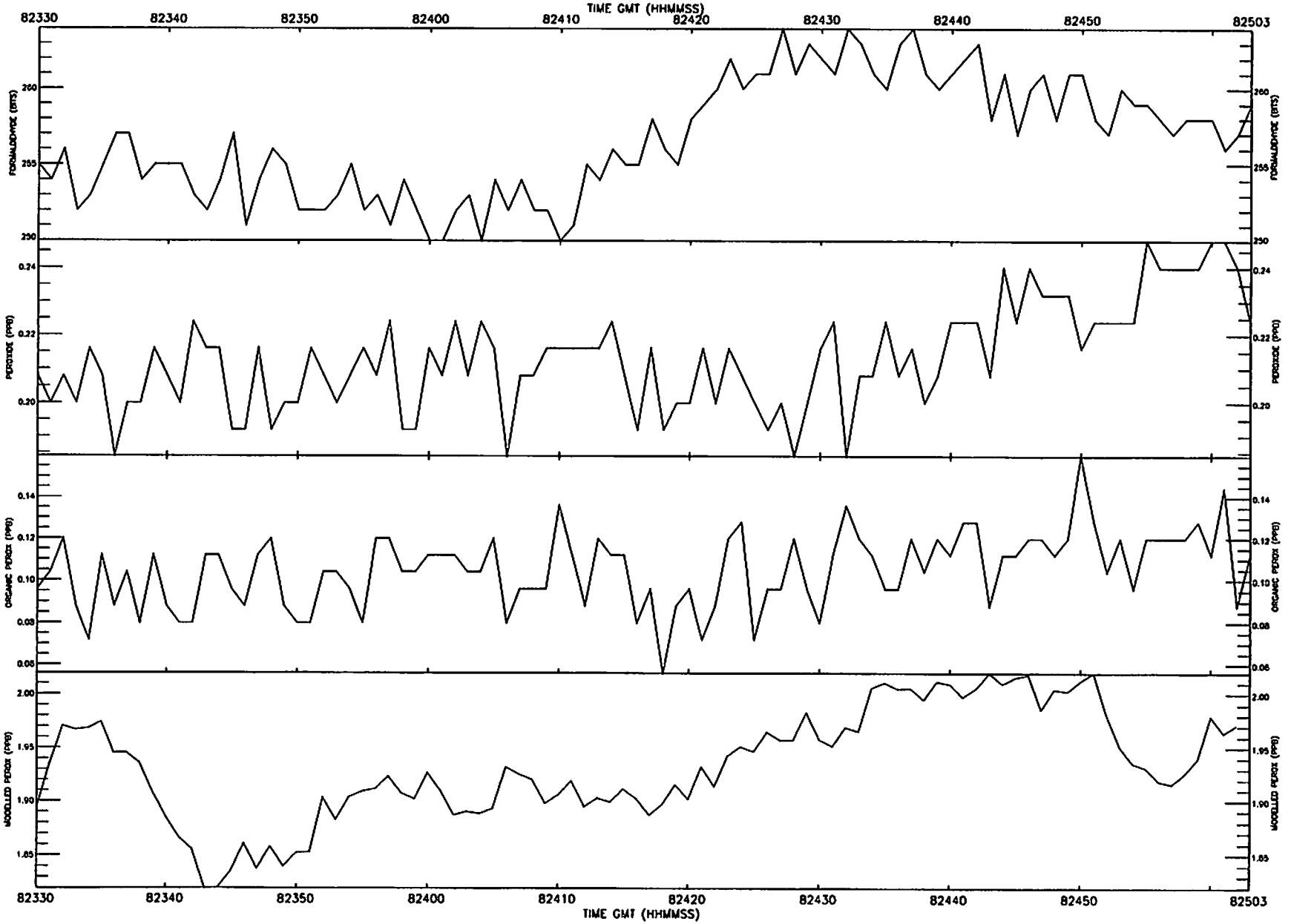
A533 05-APR-97 R2 FL085 From 82330-82503 *Plotted 6-Jun-1997 16:27*



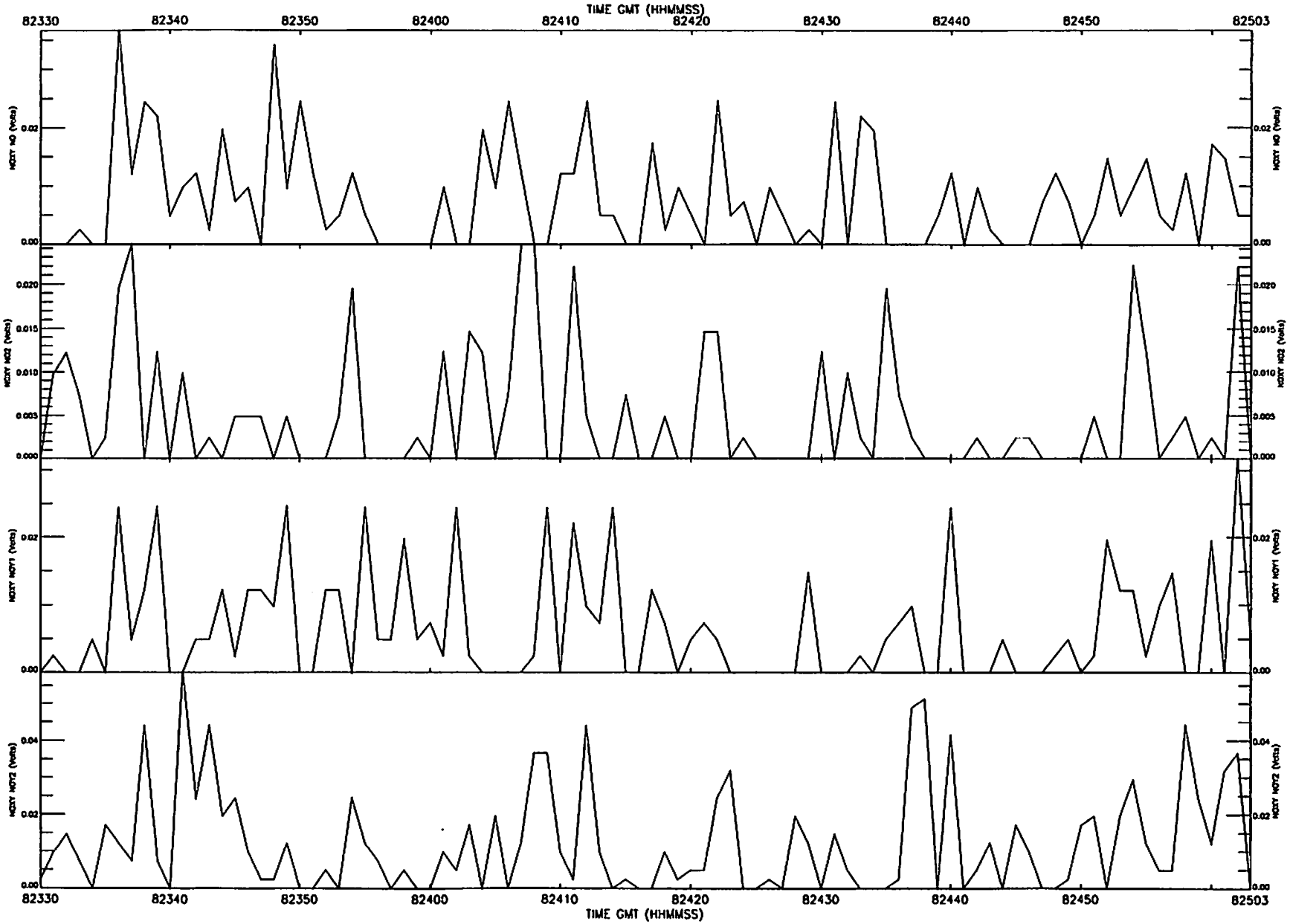
A533 05-APR-97 R2 FL085 From 82330-82503 *Plotted 6-Jun-1997 16:27*



A533 05-APR-97 R2 FL085 From 82330-82503 *Plotted 6-Jun-1997 16:27*



A533 05-APR-97 R2 FL085 From 82330-82503 *Plotted 6-Jun-1997 16:27*



A533 05-APR-97 R2 FL085 From 82330-82503 *Plotted 6-Jun-1997 16:27*

STATIC PRESSURE (MB)
No of obs 94
Mean 737.357
Standard dev 1.78361
Max value 740.441
Min value 734.691

DEICED TRUE TEMP (DEG K)
No of obs 94
Mean 272.924
Standard dev 0.236399
Max value 273.156
Min value 272.061

DEW POINT (DEG K)
No of obs 94
Mean 271.295
Standard dev 0.427490
Max value 271.953
Min value 270.616

OZONE MIXING RATIO (PPB)
No of obs 94
Mean 55.6628
Standard dev 0.928430
Max value 57.6339
Min value 53.4668

JNO2 TOTAL (E-3/S)
No of obs 94
Mean 11.1468
Standard dev 0.844887
Max value 13.1873
Min value 9.31313

PEROXIDE (PPB)
No of obs 94
Mean 0.213191
Standard dev 1.532815e-02
Max value 0.248000
Min value 0.184000

PRESSURE HEIGHT (METRES)
No of obs 94
Mean 2601.40
Standard dev 19.1982
Max value 2630.13
Min value 2568.23

CORRECTED LATITUDE (DEGREES)
No of obs 94
Mean 55.3589
Standard dev 5.862077e-03
Max value 55.3686
Min value 55.3487

CORRECTED LONGITUDE (DEGREES)
No of obs 94
Mean -5.53357
Standard dev 3.130574e-02
Max value -5.47929
Min value -5.58639

NORTHWARD WIND COMPT (M S-1)
No of obs 94
Mean -13.0184
Standard dev 0.755690
Max value -11.8988
Min value -14.7485

EASTWARD WIND COMPT (M S-1)
No of obs 94
Mean 24.3692
Standard dev 0.347412
Max value 24.9626
Min value 23.5071

VERTICAL WIND COMPT (M S-1)
No of obs 94
Mean -1.94333
Standard dev 0.511130
Max value -0.691391
Min value -2.64047

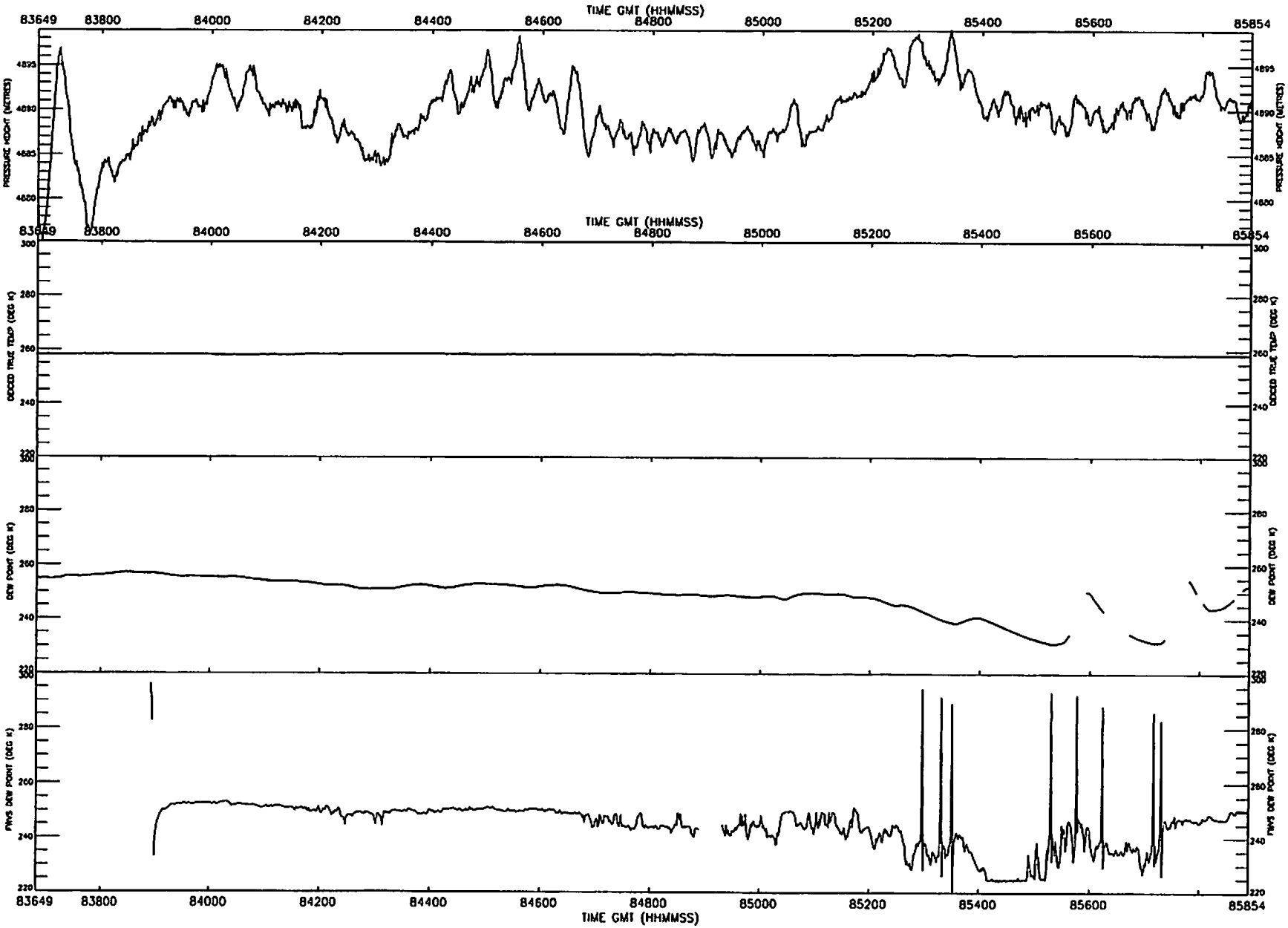
WIND SPEED (MS-1)
No of obs 94
Mean 27.6401
Standard dev 0.220397
Max value 28.1117
Min value 27.1101

WIND DIRECTION (DEG)
Mean 298.112

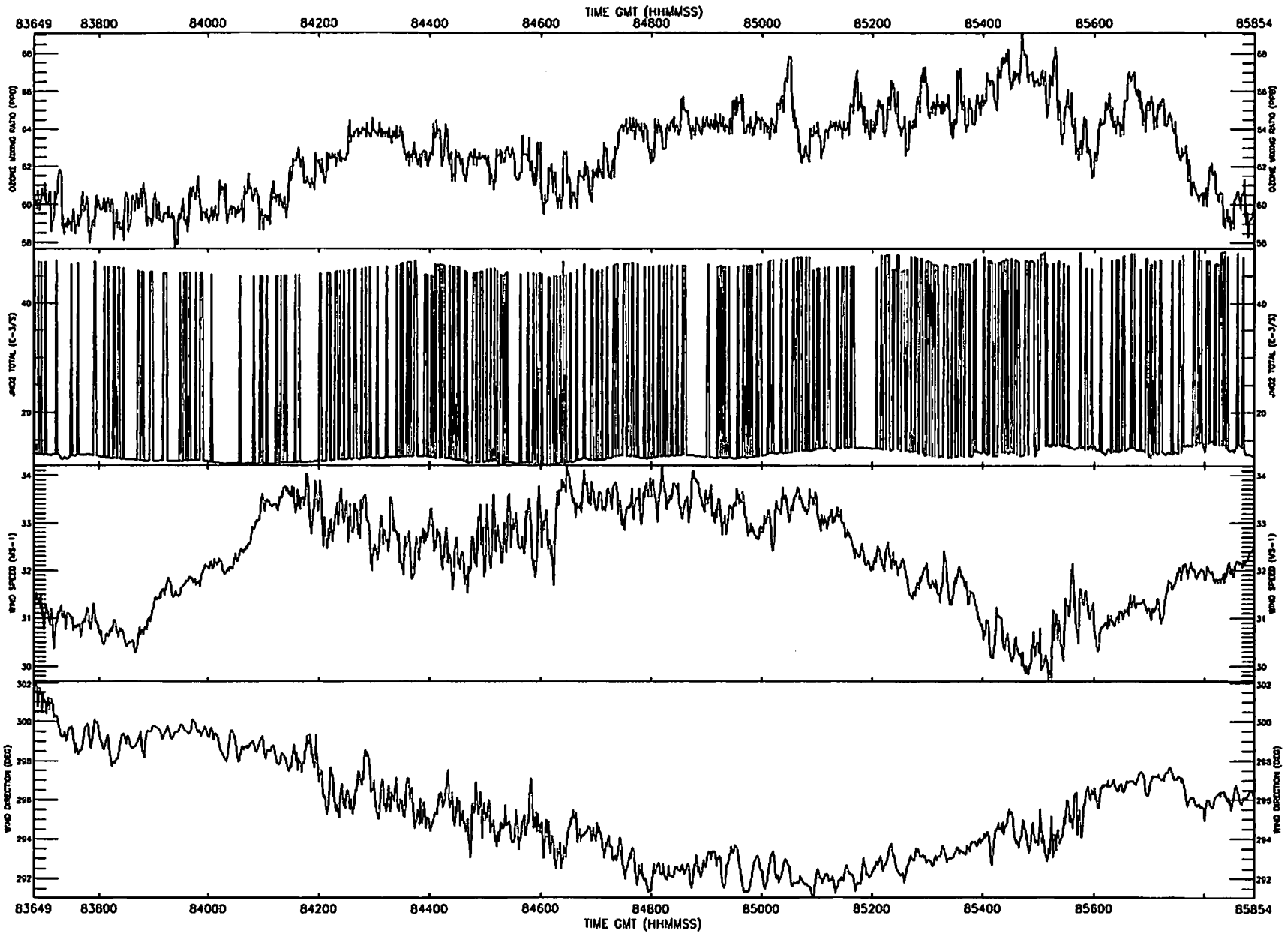
TRUE AIR SPEED (M S-1)
No of obs 94
Mean 103.658
Standard dev 2.17663
Max value 107.352
Min value 101.050

HEADING (DEG)
Mean 288.076

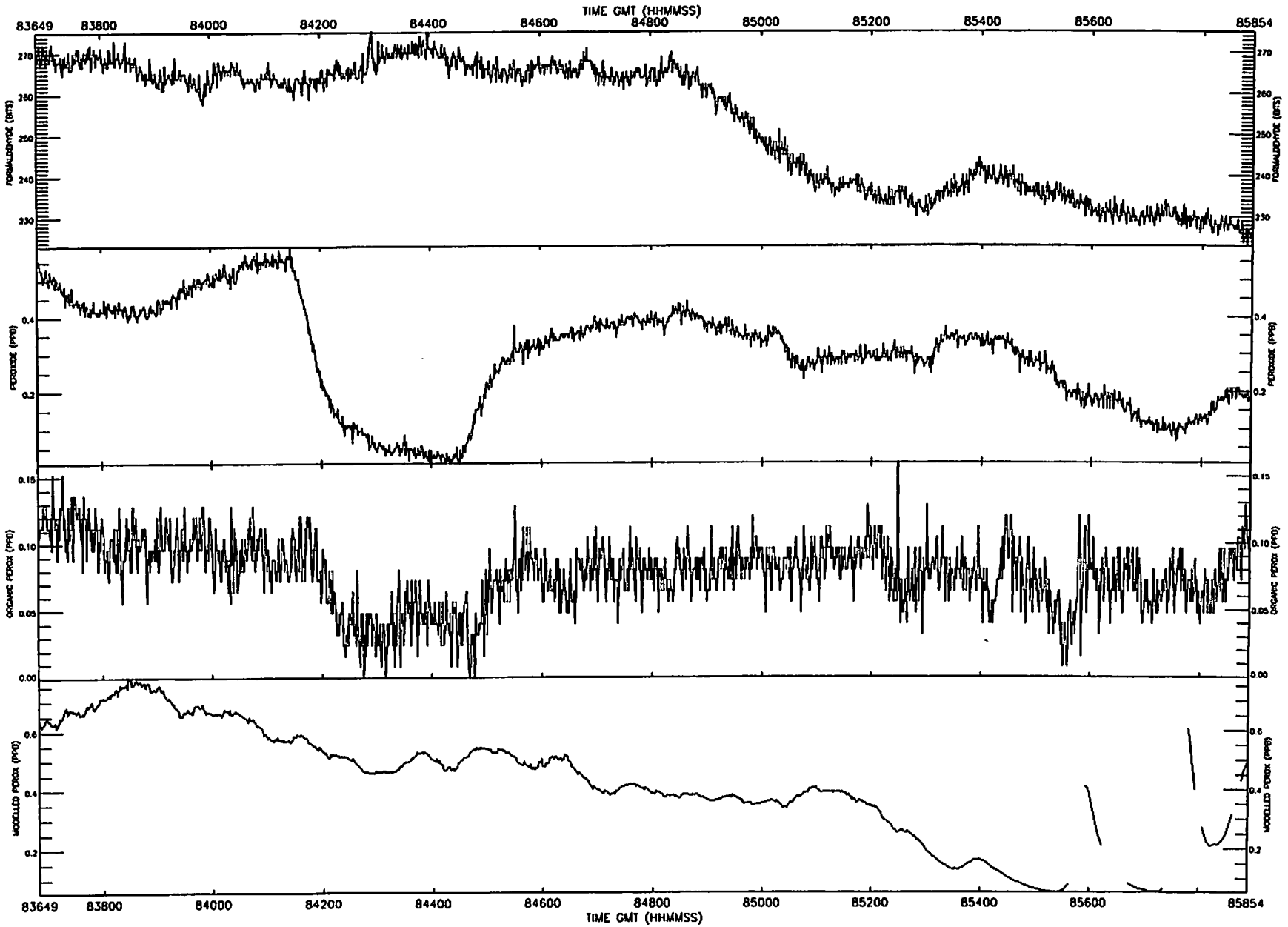
A533 05-APR-97 R3 FL160 From 83649-85854 *Plotted 19-Jun-1997 08:39*



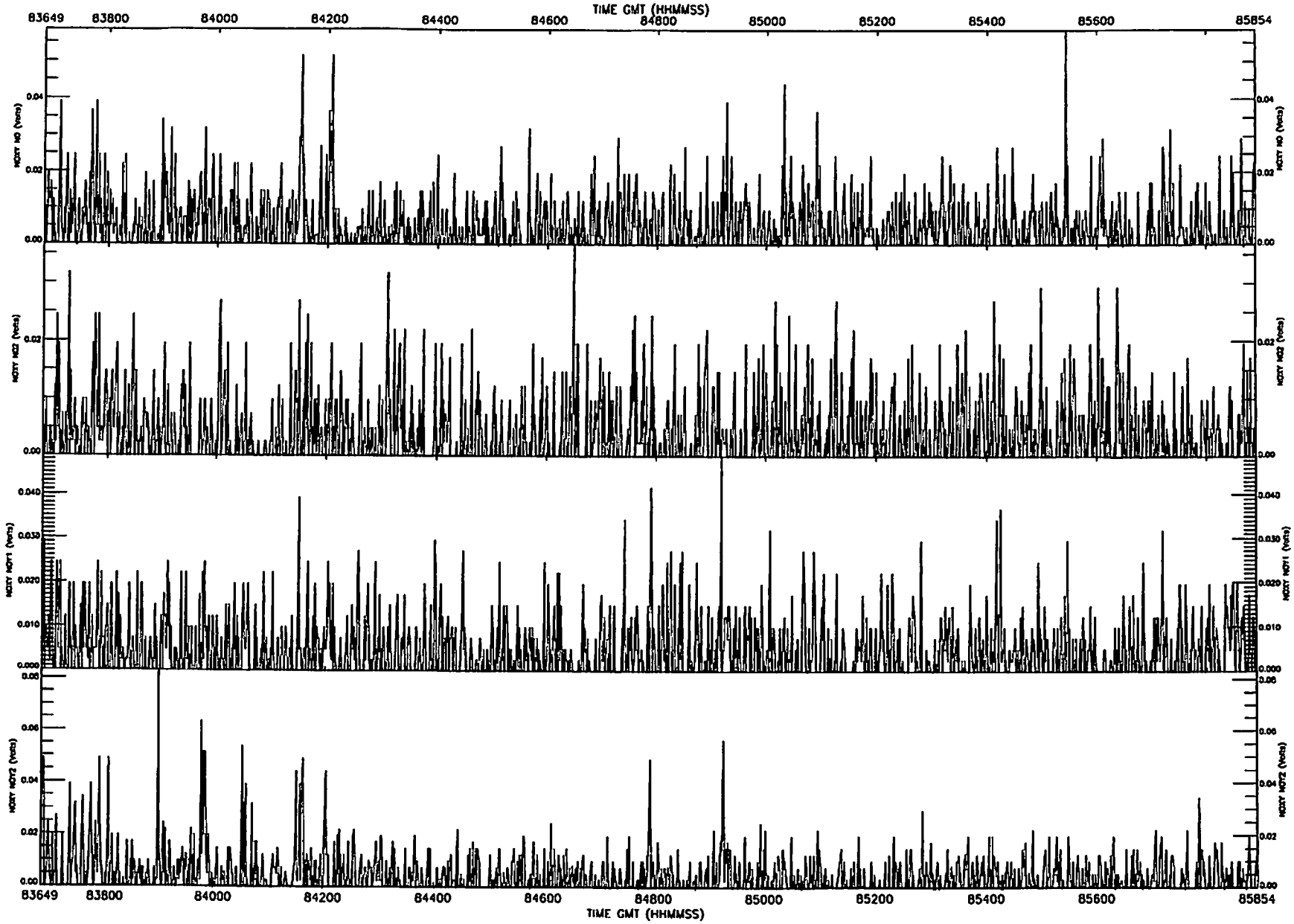
A533 05-APR-97 R3 FL160 From 83649-85854 *Plotted 19-Jun-1997 08:39*



A533 05-APR-97 R3 FL160 From 83649-85854 *Plotted 6-Jun-1997 16:31*



A533 05-APR-97 R3 FL160 From 83649-85854 *Plotted 6-Jun-1997 16:31*



A533 05-APR-97 R3 FL160 From 83649-85854 *Plotted 6-Jun-1997 16:31*

STATIC PRESSURE (MB)
No of obs 1326
Mean 548.207
Standard dev 0.263001
Max value 549.261
Min value 547.531

DEICED TRUE TEMP (DEG K)
No of obs 1326
Mean 258.376
Standard dev 0.111055
Max value 258.615
Min value 257.971

DEW POINT (DEG K)
No of obs 1326
Mean 248.668
Standard dev 6.66747
Max value 257.137
Min value 231.216

OZONE MIXING RATIO (PPB)
No of obs 1326
Mean 62.8184
Standard dev 2.31453
Max value 69.0933
Min value 57.6837

JNO2 TOTAL (E-3/S)
No of obs 1326
Mean 21.1982
Standard dev 15.3716
Max value 51.4538
Min value 10.4053

PEROXIDE (PPB)
No of obs 1326
Mean 0.299704
Standard dev 0.141113
Max value 0.592000
Min value 7.999998e-03

PRESSURE HEIGHT (METRES)
No of obs 1326
Mean 4889.65
Standard dev 3.59985
Max value 4898.90
Min value 4875.22

CORRECTED LATITUDE (DEGREES)
No of obs 1326
Mean 55.6955
Standard dev 9.397659e-02
Max value 55.8372
Min value 55.5300

CORRECTED LONGITUDE (DEGREES)
No of obs 1326
Mean -7.29553
Standard dev 0.492821
Max value -6.43931
Min value -8.16790

NORTHWARD WIND COMPT (M S-1)
No of obs 1326
Mean -13.8190
Standard dev 1.20680
Max value -11.6768
Min value -16.6921

EASTWARD WIND COMPT (M S-1)
No of obs 1326
Mean 29.0868
Standard dev 1.31891
Max value 31.6714
Min value 26.2524

VERTICAL WIND COMPT (M S-1)
No of obs 1326
Mean 0.548581
Standard dev 0.583260
Max value 2.48439
Min value -0.546036

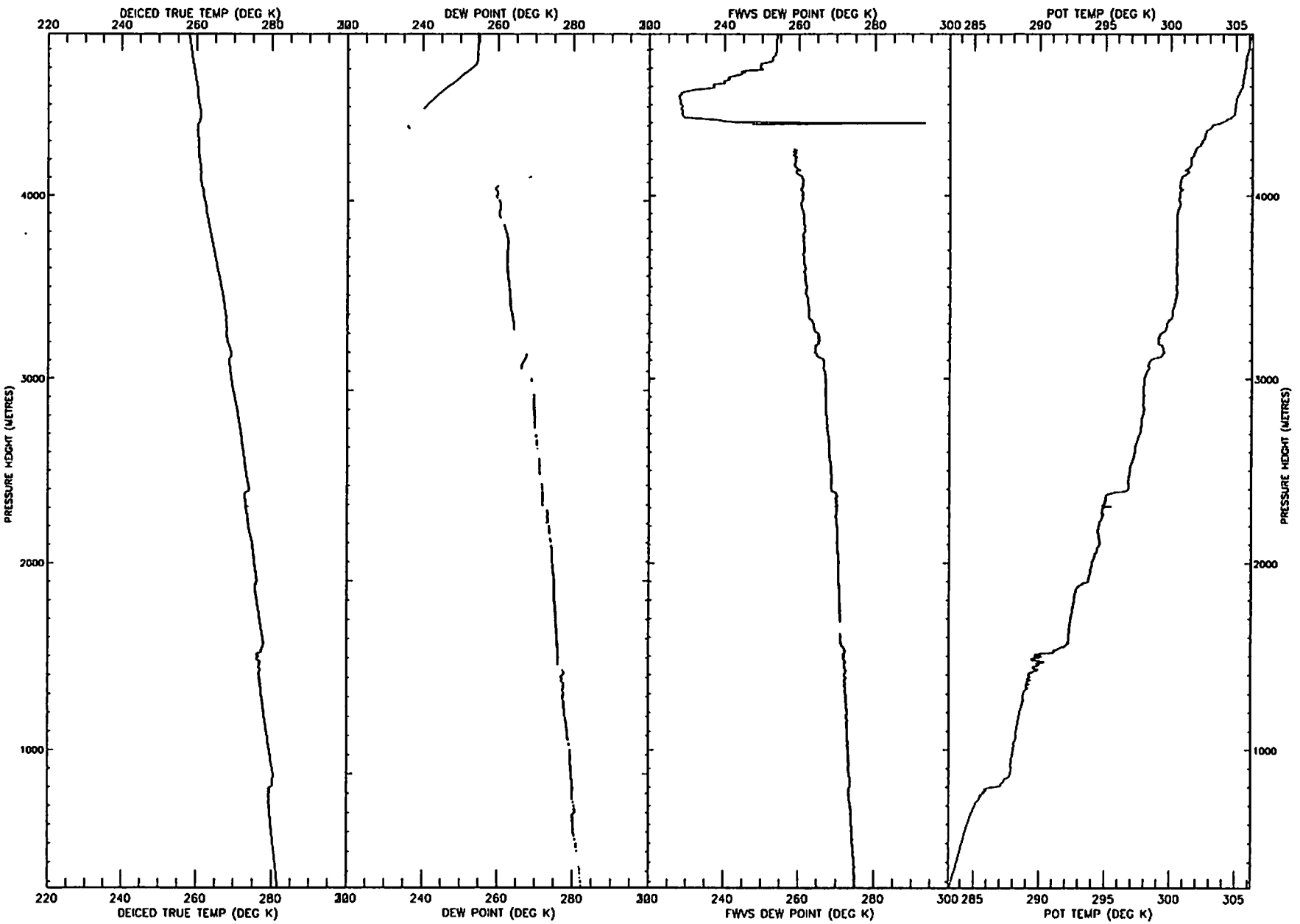
WIND SPEED (MS-1)
No of obs 1326
Mean 32.2353
Standard dev 1.04305
Max value 34.2121
Min value 29.6865

WIND DIRECTION (DEG)
Mean 295.412

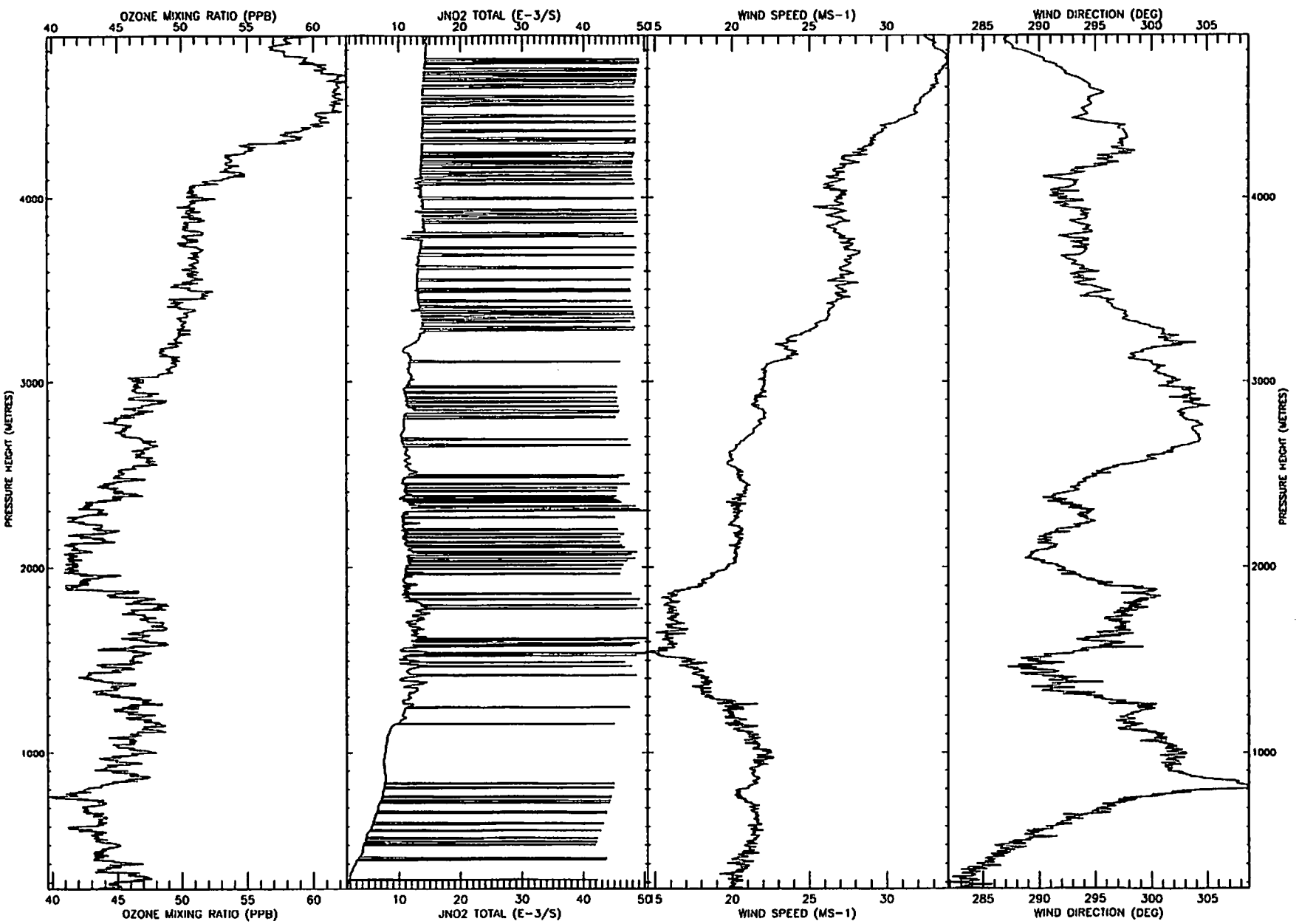
TRUE AIR SPEED (M S-1)
No of obs 1326
Mean 117.697
Standard dev 1.95388
Max value 121.516
Min value 112.302

HEADING (DEG)
Mean 287.460

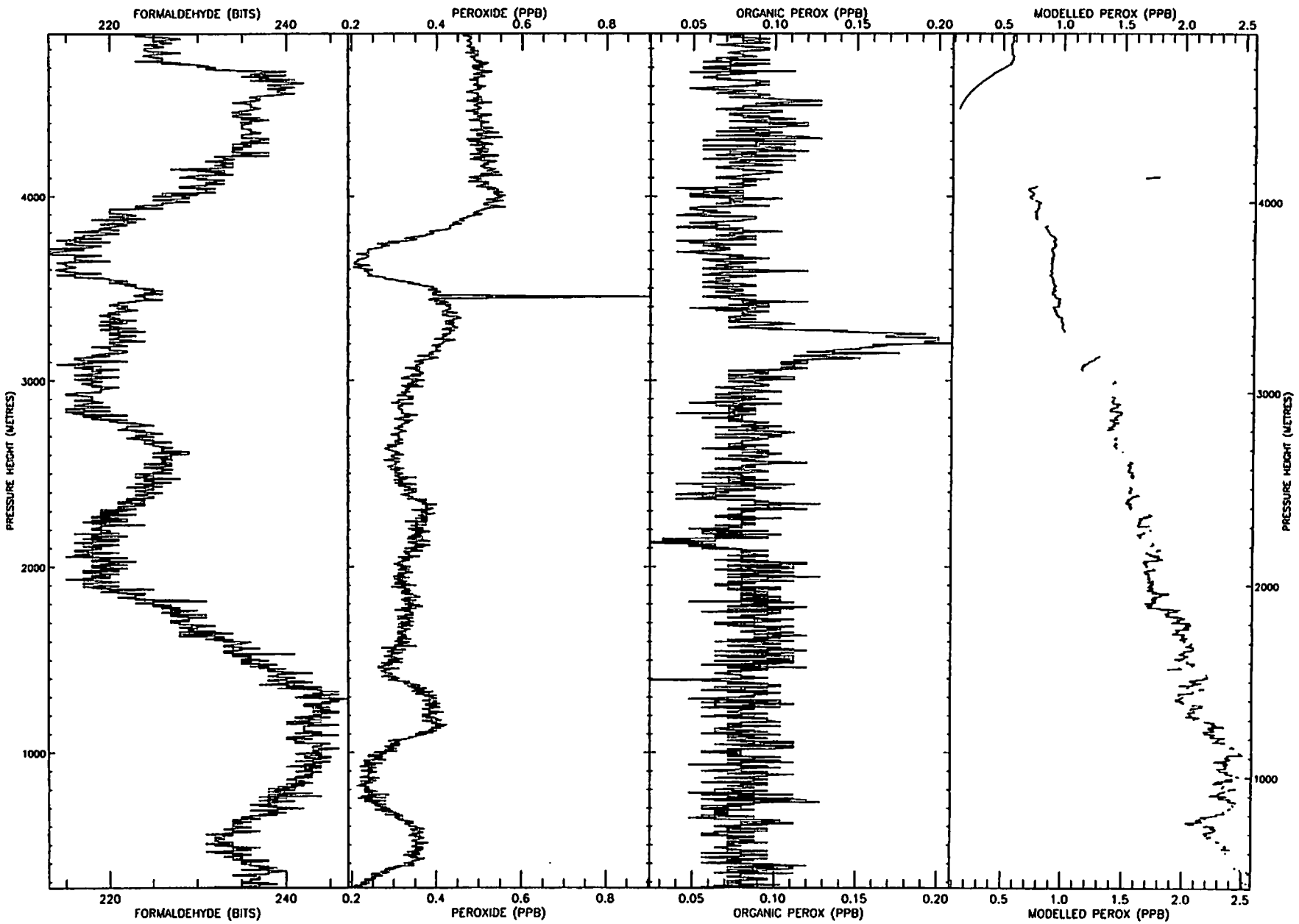
A533 05-APR-97 P1 FL160-900ft From 90826-92800 *Plotted 19-Jun-1997 08:42*



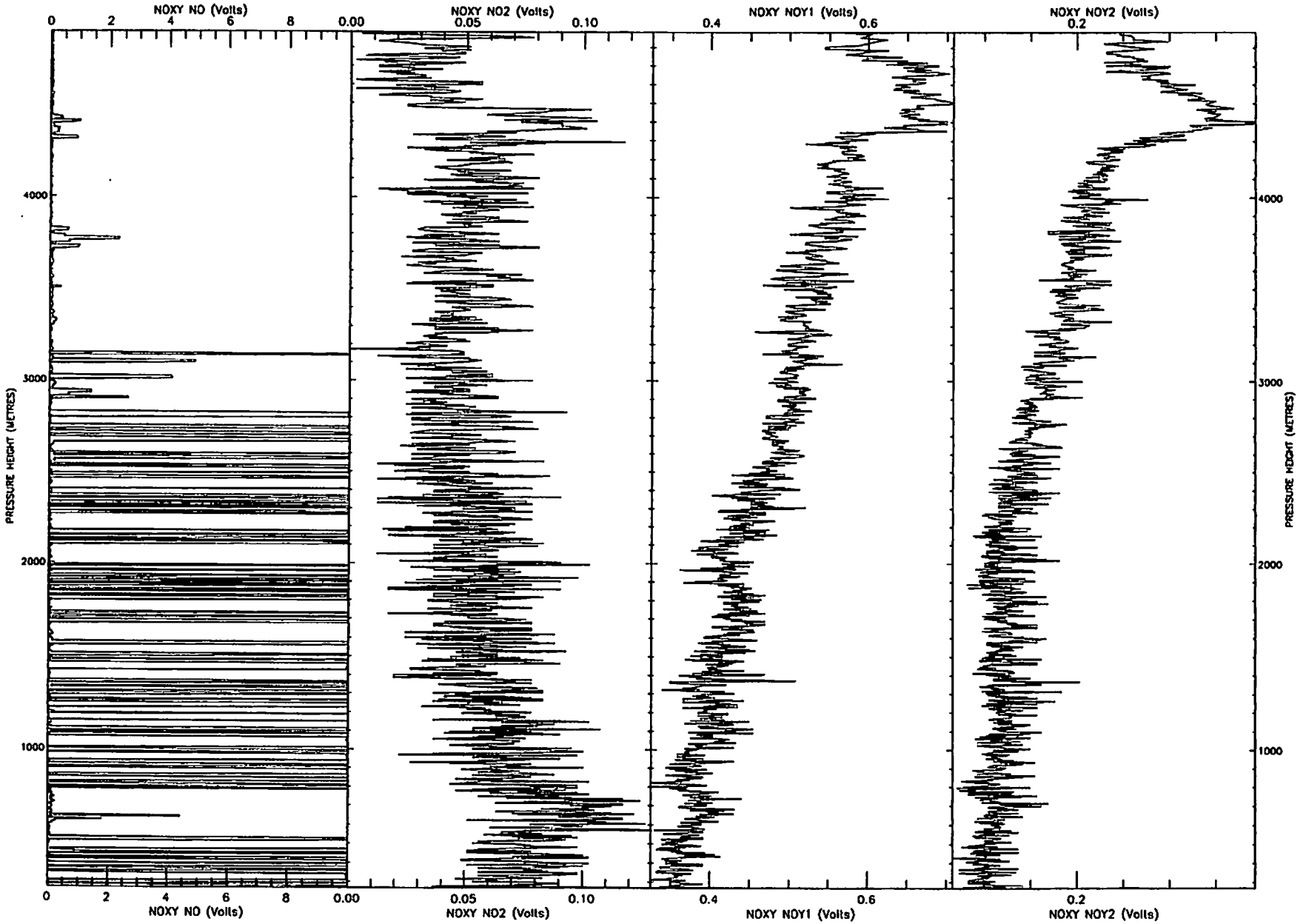
A533 05-APR-97 P1 FL160-900ft From 90826-92800 *Plotted 19-Jun-1997 08:42*



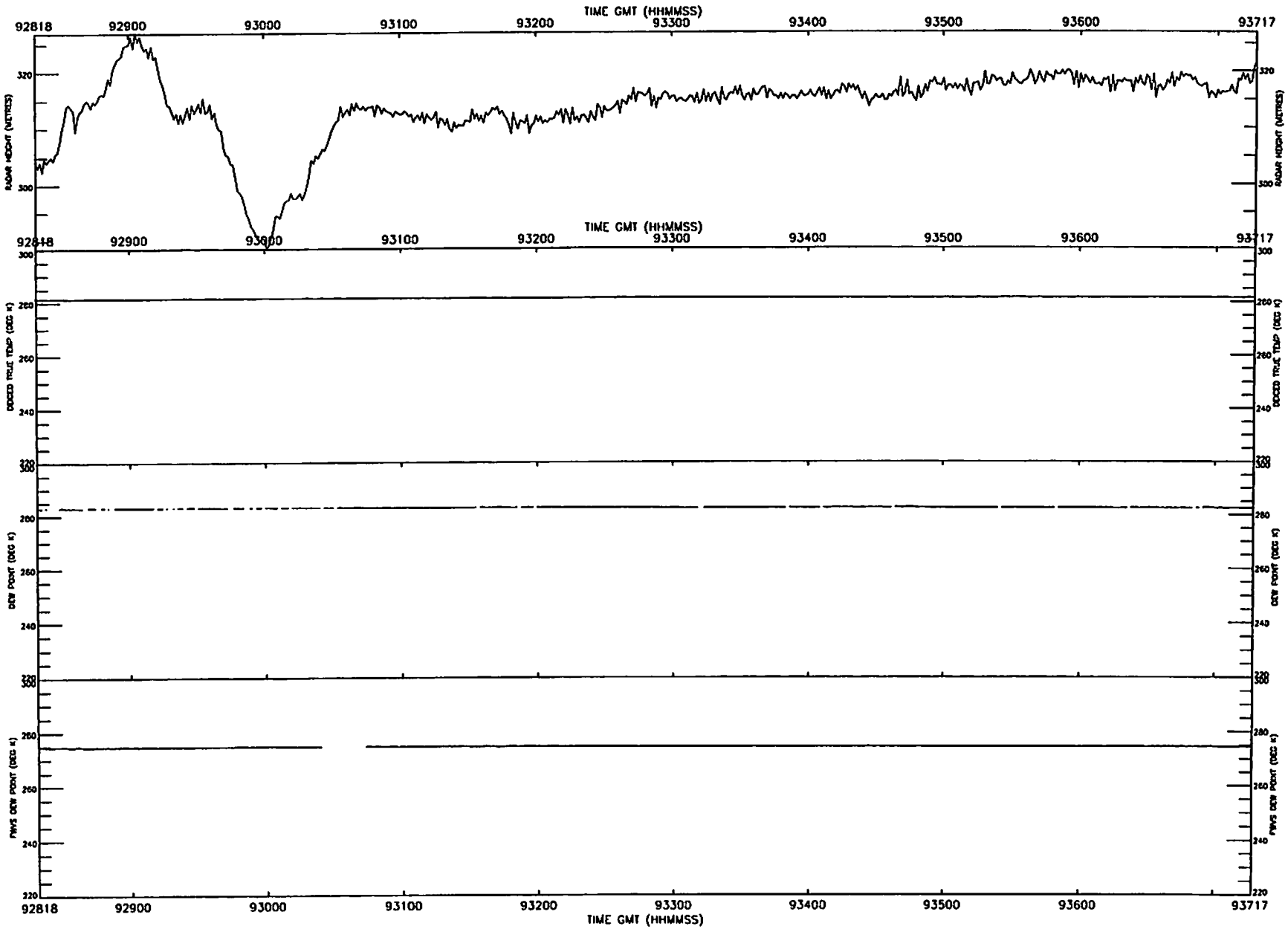
A533 05-APR-97 P1 FL160-900ft From 90826-92800 *Plotted 6-Jun-1997 16:35*



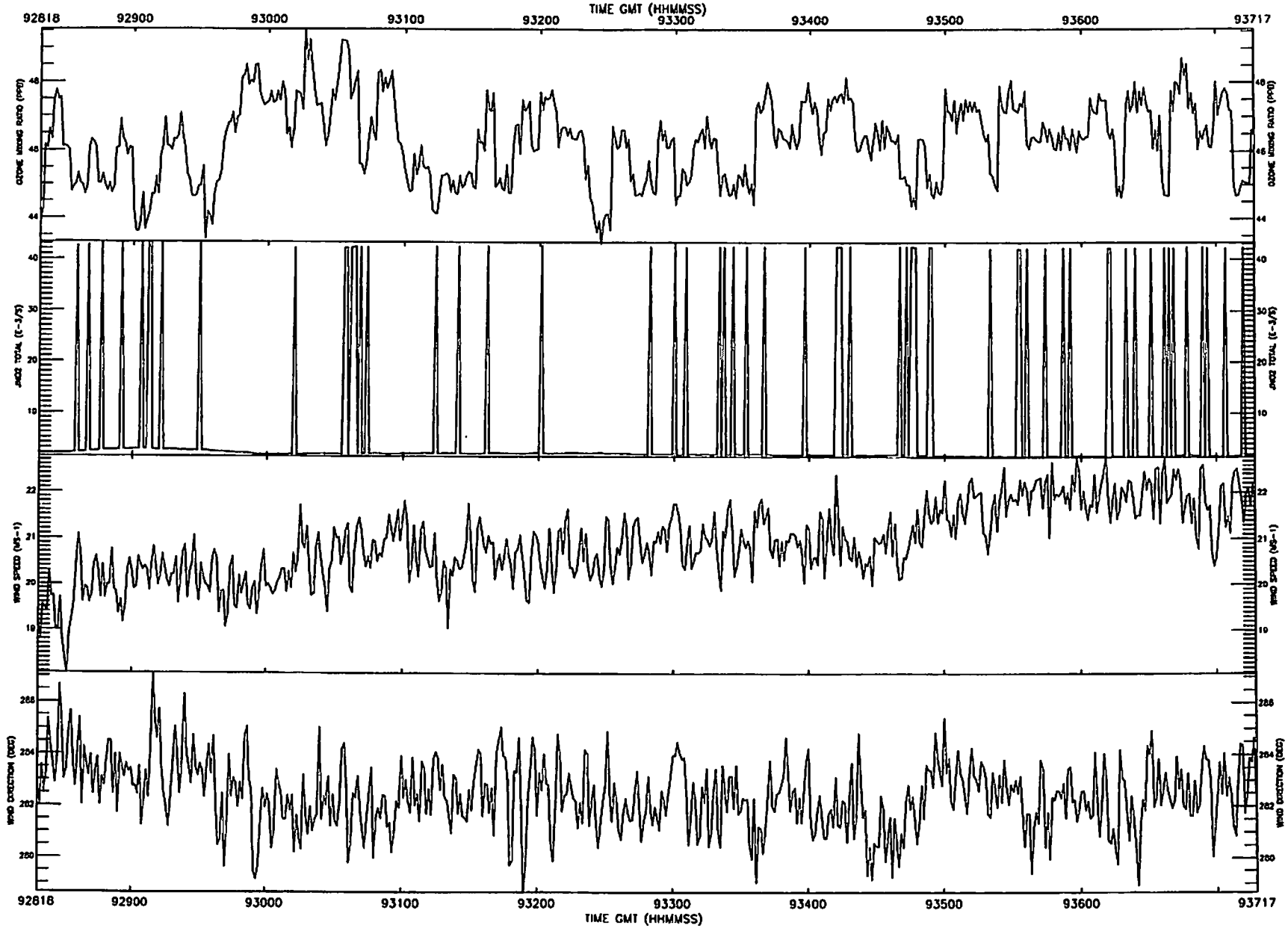
A533 05-APR-97 P1 FL160-900ft From 90826-92800 *Plotted 6-Jun-1997 16:35*



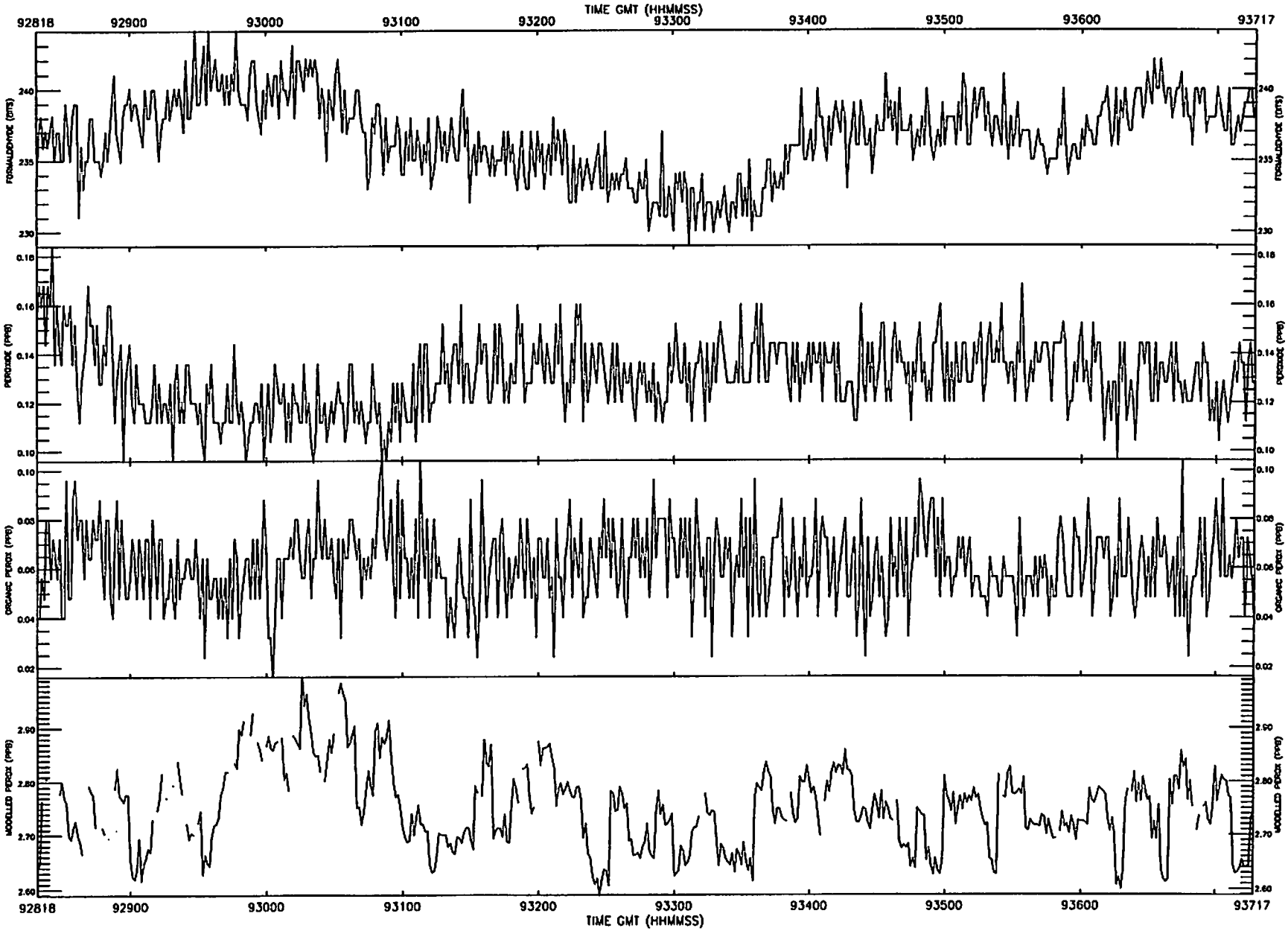
A533 05-APR-97 R4 1000' From 92818-93717 *Plotted 19-Jun-1997 08:44*



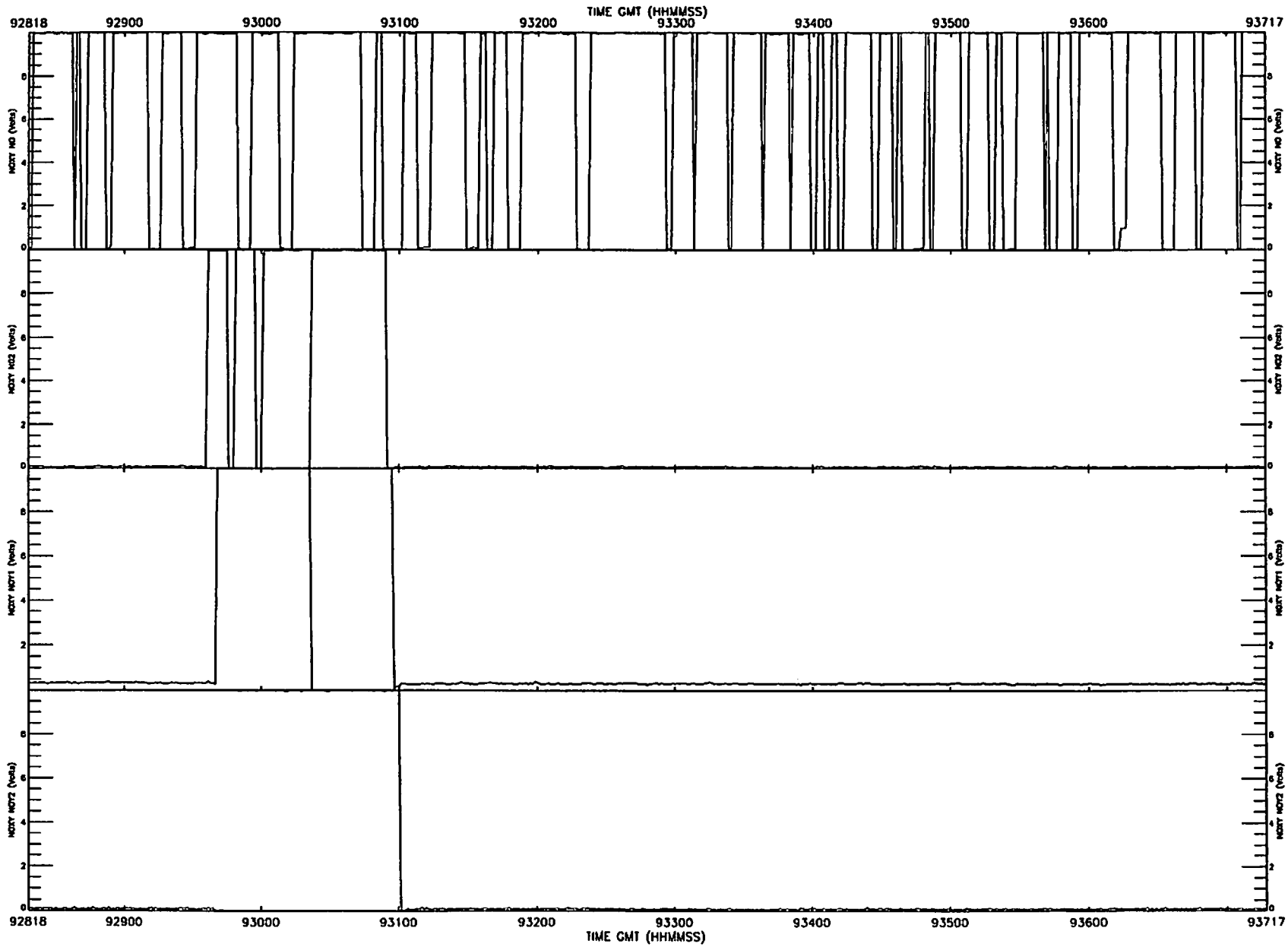
A533 05-APR-97 R4 1000' From 92818-93717 *Plotted 19-Jun-1997 08:44*



A533 05-APR-97 R4 1000' From 92818-93717 *Plotted 6-Jun-1997 16:37*



A533 05-APR-97 R4 1000' From 92818-93717 *Plotted 6-Jun-1997 16:37*



A533 05-APR-97 R4 1000' From 92818-93717 *Plotted 6-Jun-1997 16:37*

STATIC PRESSURE (MB)
No of obs 540
Mean 977.781
Standard dev 0.640348
Max value 980.338
Min value 975.879

DEICED TRUE TEMP (DEG K)
No of obs 540
Mean 281.571
Standard dev 5.408504e-02
Max value 281.697
Min value 281.393

DEW POINT (DEG K)
No of obs 540
Mean 282.839
Standard dev 0.188691
Max value 283.179
Min value 282.506

OZONE MIXING RATIO (PPB)
No of obs 540
Mean 46.2774
Standard dev 1.18269
Max value 49.5574
Min value 43.3068

JNO2 TOTAL (E-3/S)
No of obs 540
Mean 6.63933
Standard dev 13.2658
Max value 44.8228
Min value 1.38106

PEROXIDE (PPB)
No of obs 540
Mean 0.130178
Standard dev 1.454205e-02
Max value 0.184000
Min value 9.599999e-02

RADAR HEIGHT (METRES)
No of obs 540
Mean 313.810
Standard dev 6.18957
Max value 326.933
Min value 288.462

CORRECTED LATITUDE (DEGREES)
No of obs 540
Mean 55.8714
Standard dev 2.863221e-02
Max value 55.9220
Min value 55.8219

CORRECTED LONGITUDE (DEGREES)
No of obs 540
Mean -10.8114
Standard dev 0.179440
Max value -10.4990
Min value -11.1199

NORTHWARD WIND COMPT (M S-1)
No of obs 540
Mean -4.49686
Standard dev 0.506429
Max value -3.03989
Min value -6.12244

EASTWARD WIND COMPT (M S-1)
No of obs 540
Mean 20.3977
Standard dev 0.811339
Max value 22.2689
Min value 17.5765

VERTICAL WIND COMPT (M S-1)
No of obs 540
Mean -0.235238
Standard dev 0.327044
Max value 1.22458
Min value -1.05553

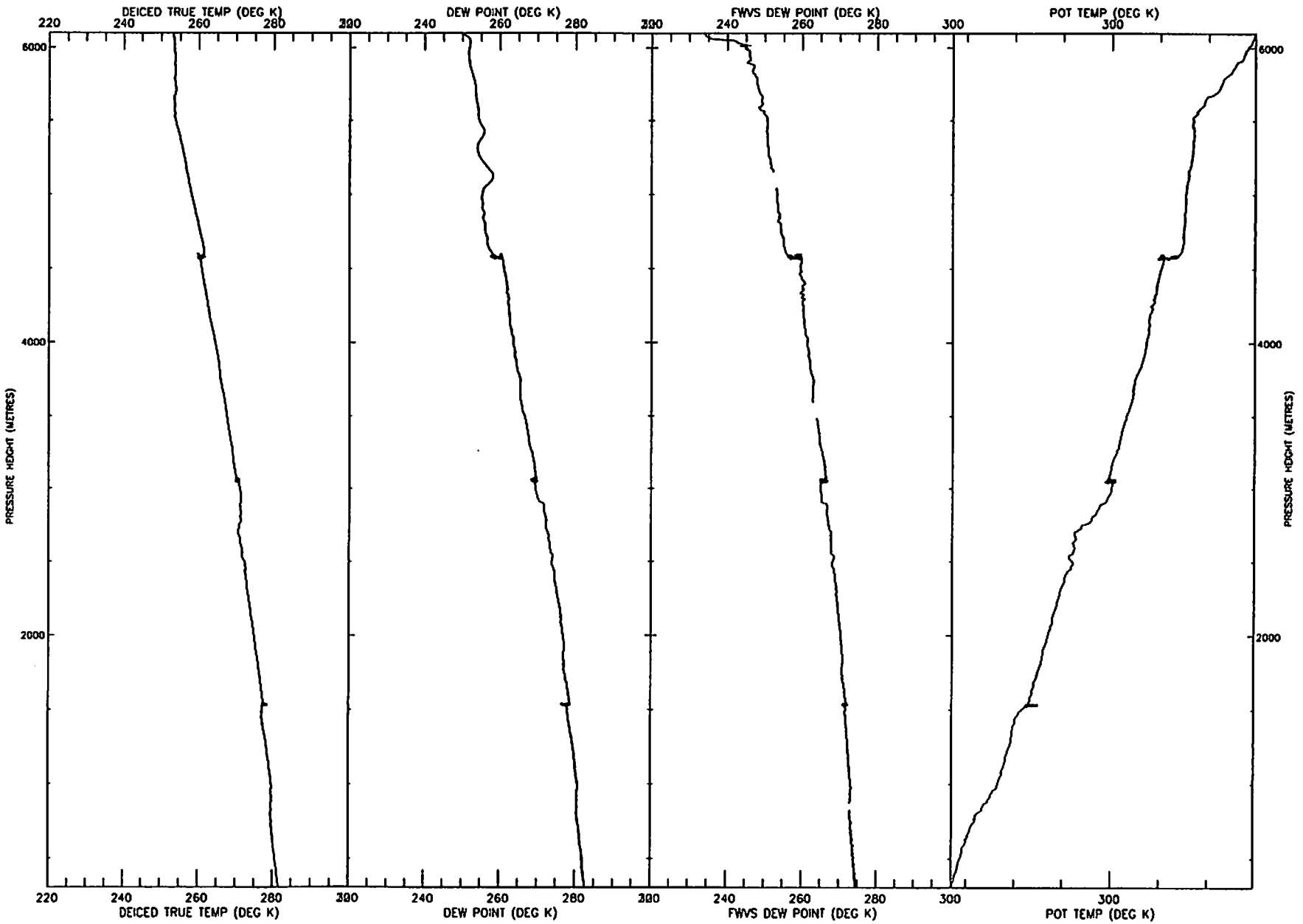
WIND SPEED (MS-1)
No of obs 540
Mean 20.8930
Standard dev 0.827202
Max value 22.7801
Min value 18.0690

WIND DIRECTION (DEG)
Mean 282.432

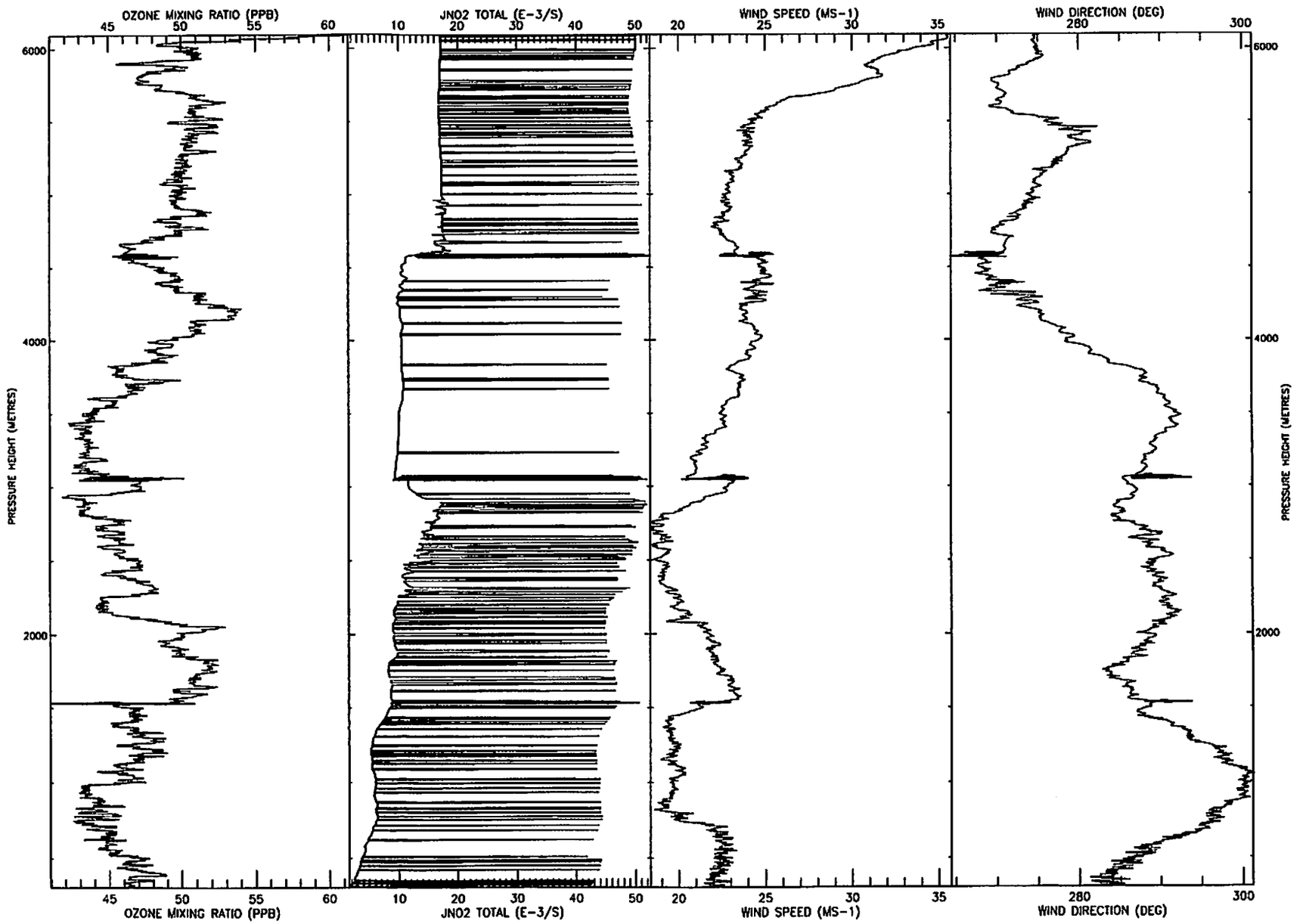
TRUE AIR SPEED (M S-1)
No of obs 540
Mean 93.5981
Standard dev 0.832250
Max value 96.4381
Min value 91.1370

HEADING (DEG)
Mean 253.995

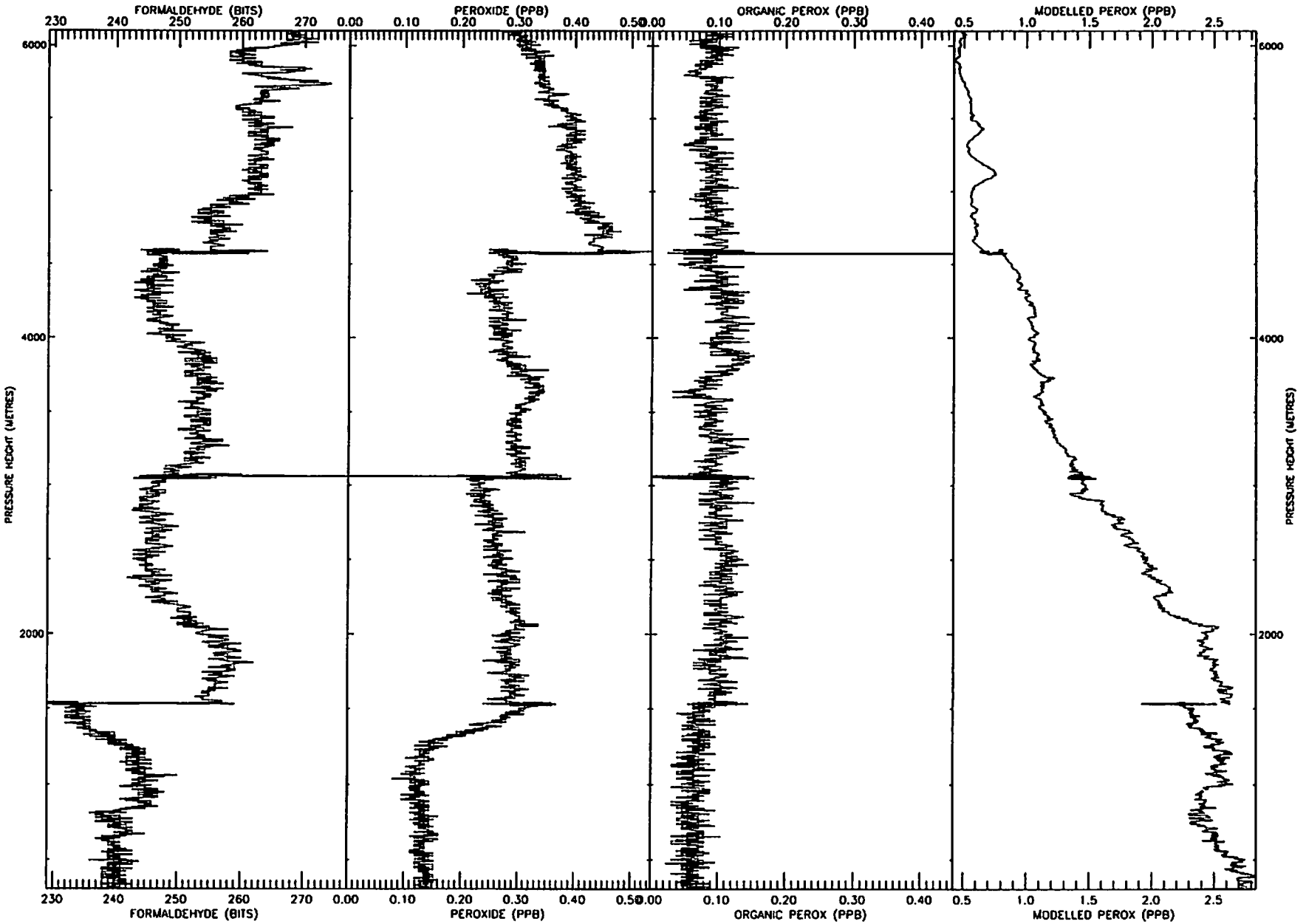
A533 05-APR-97 P2 1000'-FL200 From 93717-102627 *Plotted 19-Jun-1997 08:49*



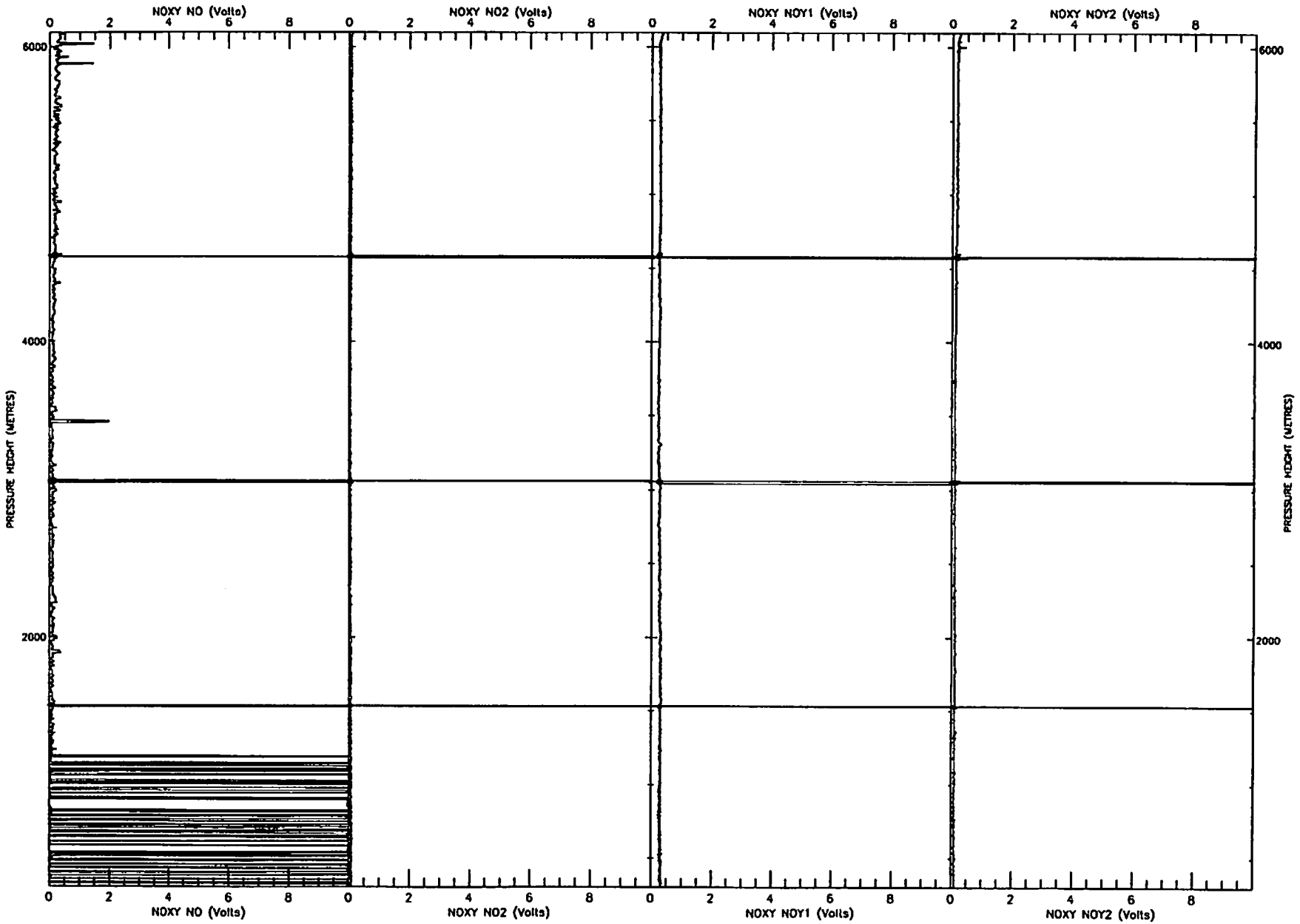
A533 05-APR-97 P2 1000'-FL200 From 93717-102627 *Plotted 19-Jun-1997 08:49*



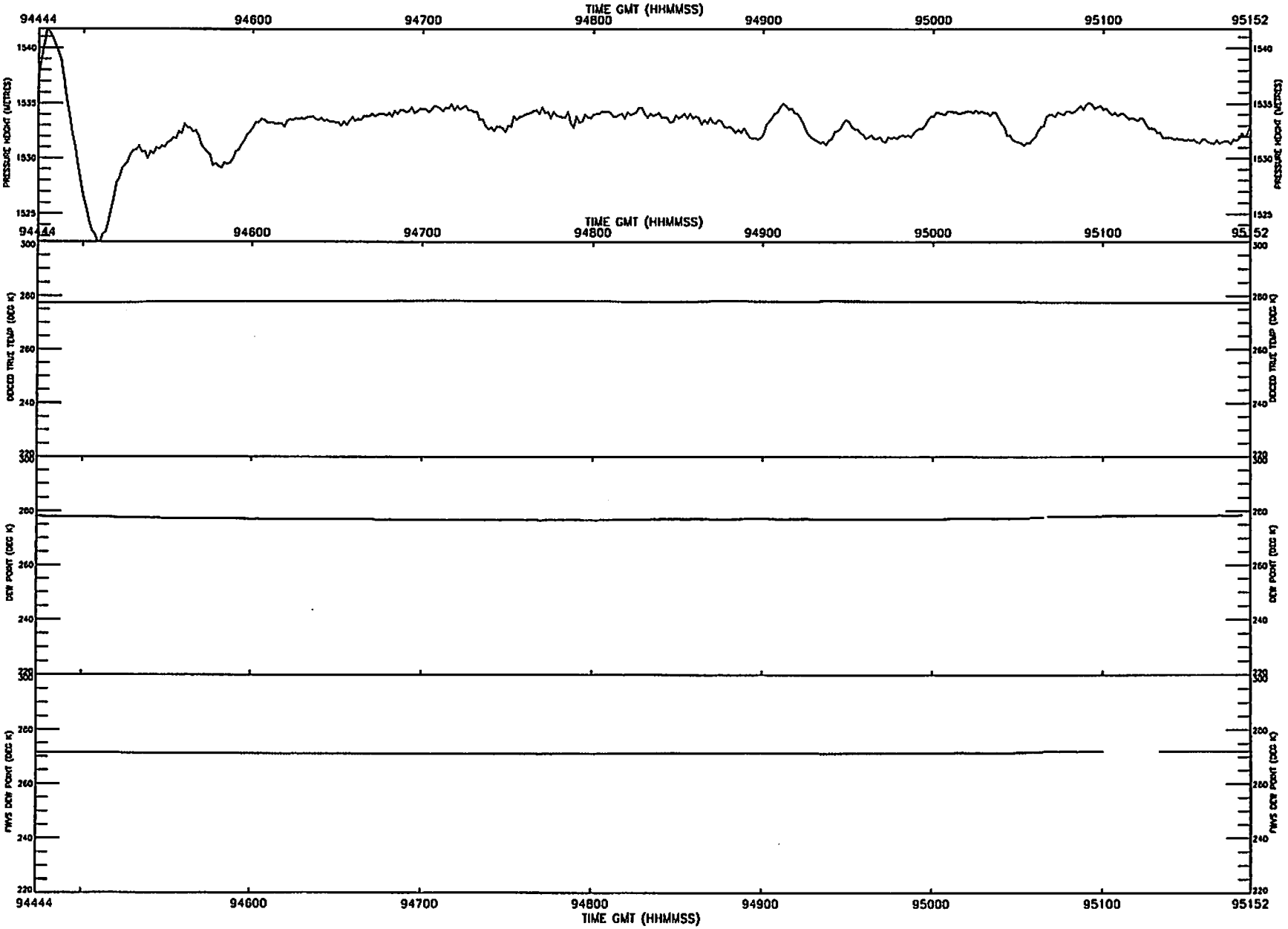
A533 05-APR-97 P2 1000'-FL200 From 93717-102627 *Plotted 6-Jun-1997 16:45*



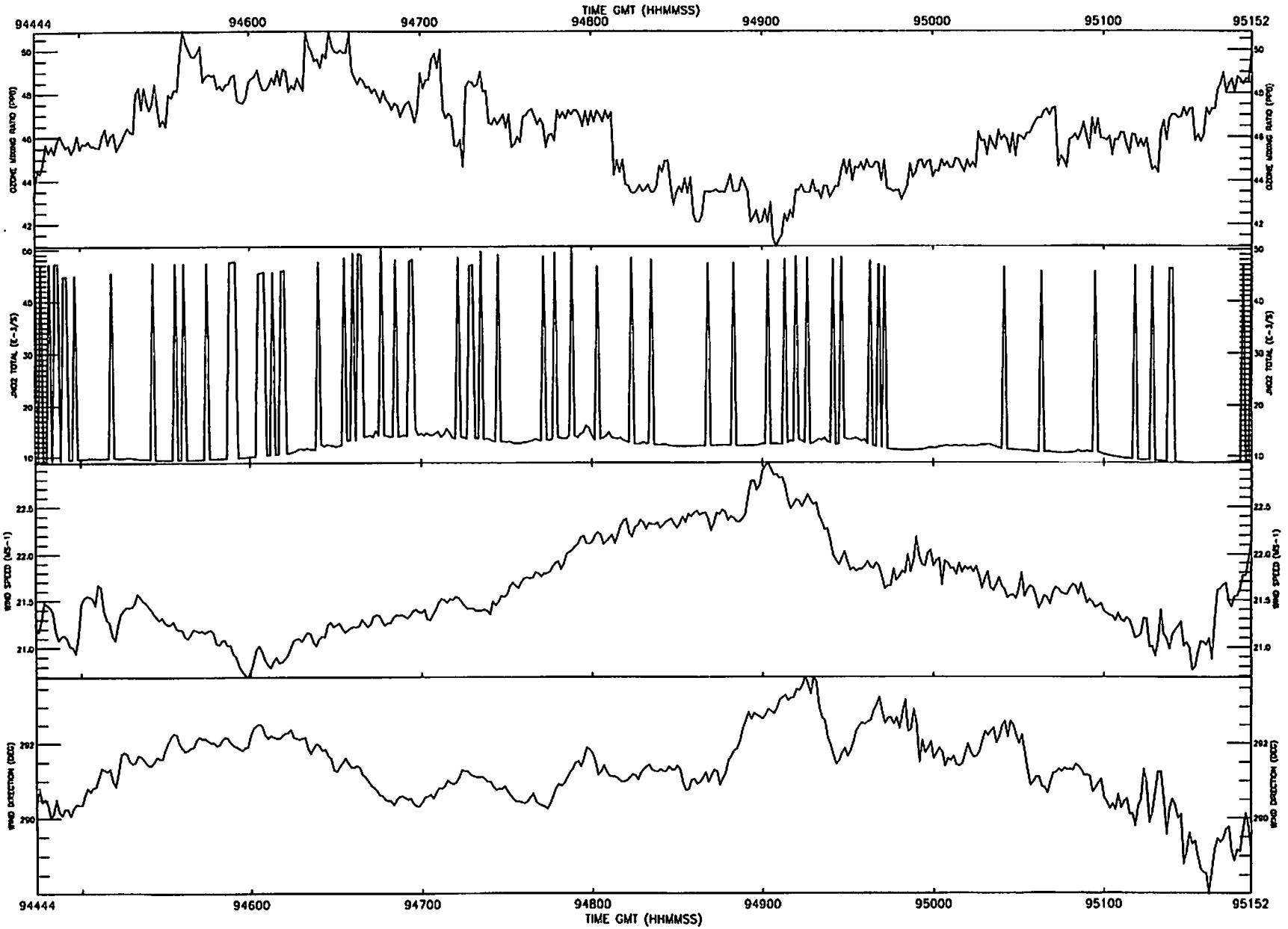
A533 05-APR-97 P2 1000'-FL200 From 93717-102627 *Plotted 6-Jun-1997 16:45*



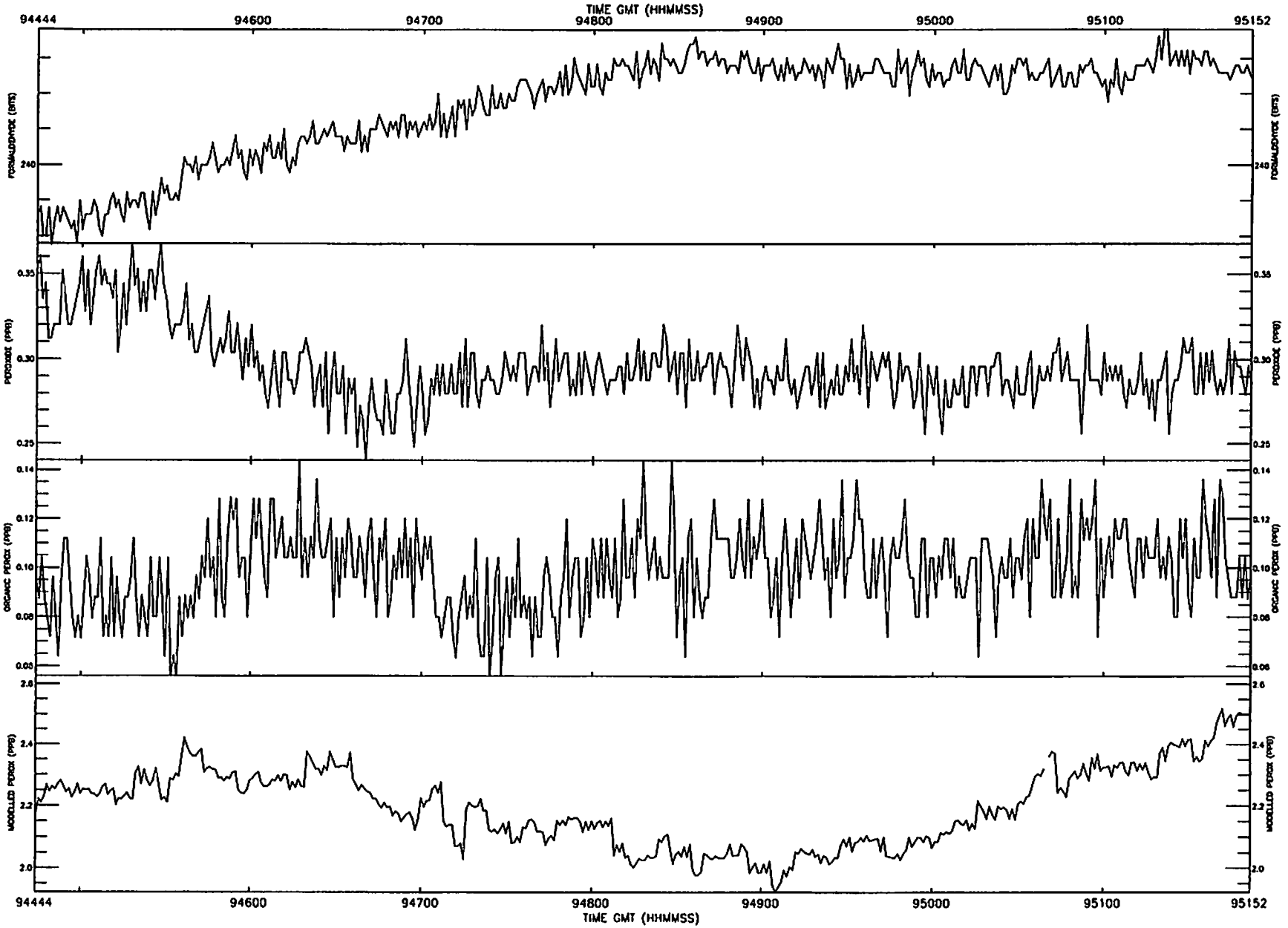
A533 05-APR-97 R5 FL050 From 94444-95152 *Plotted 19-Jun-1997 08:51*



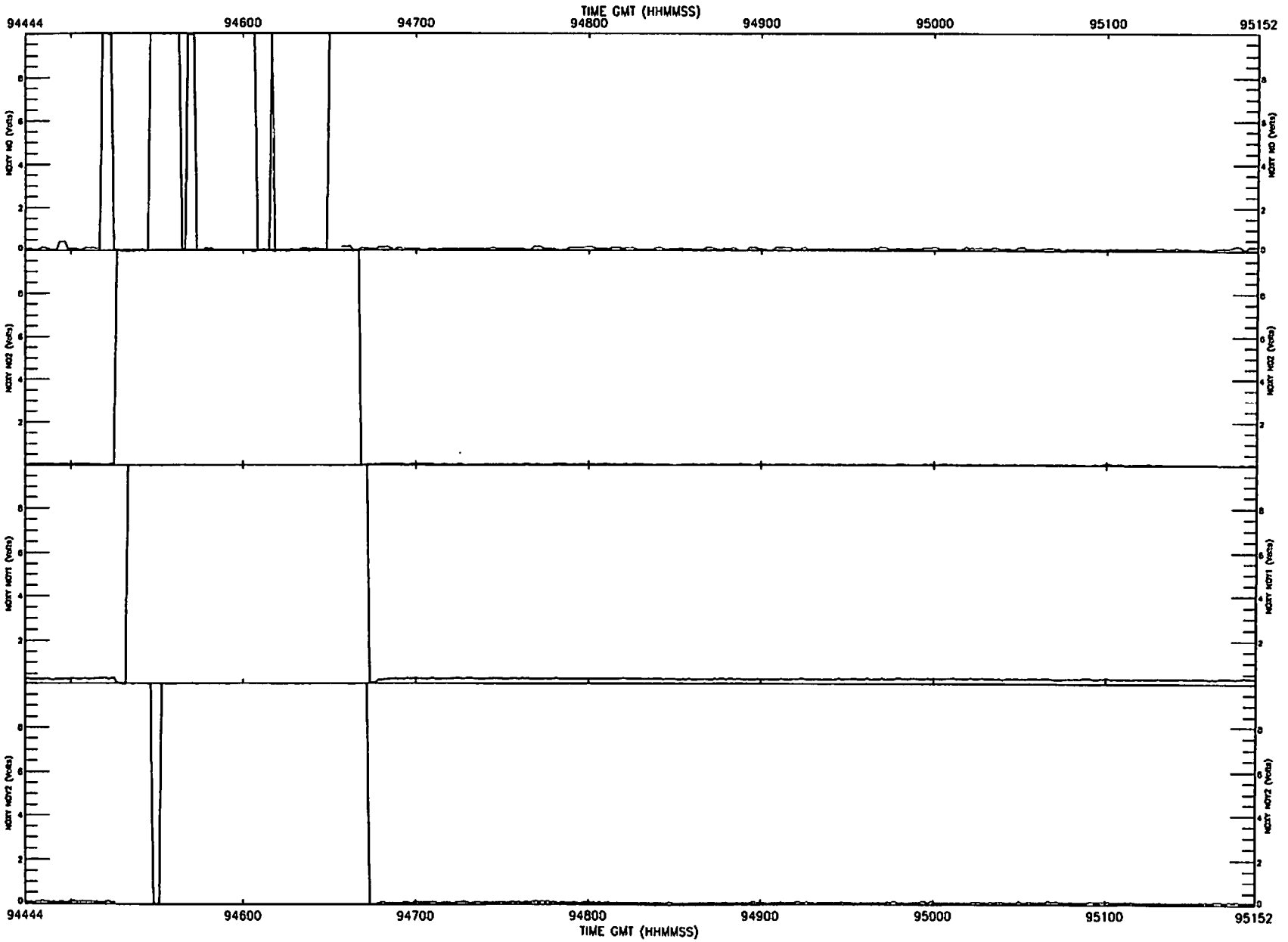
A533 05-APR-97 R5 FL050 From 94444-95152 *Plotted 19-Jun-1997 08:51*



A533 05-APR-97 R5 FL050 From 94444-95152 *Plotted 6-Jun-1997 16:47*



A533 05-APR-97 R5 FL050 From 94444-95152 *Plotted 6-Jun-1997 16:47*



A533 05-APR-97 R5 FL050 From 94444-95152 *Plotted 6-Jun-1997 16:47*

STATIC PRESSURE (MB)
No of obs 429
Mean 842.145
Standard dev 0.232544
Max value 843.227
Min value 841.237

DEICED TRUE TEMP (DEG K)
No of obs 429
Mean 278.003
Standard dev 0.281844
Max value 278.425
Min value 277.253

DEW POINT (DEG K)
No of obs 429
Mean 277.364
Standard dev 0.517352
Max value 278.770
Min value 276.646

OZONE MIXING RATIO (PPB)
No of obs 429
Mean 46.1710
Standard dev 2.05366
Max value 50.8360
Min value 40.9600

JNO2 TOTAL (E-3/S)
No of obs 429
Mean 17.1162
Standard dev 13.0118
Max value 51.8643
Min value 8.92847

PEROXIDE (PPB)
No of obs 429
Mean 0.296205
Standard dev 2.114028e-02
Max value 0.368000
Min value 0.240000

PRESSURE HEIGHT (METRES)
No of obs 429
Mean 1532.94
Standard dev 2.24829
Max value 1541.72
Min value 1522.49

CORRECTED LATITUDE (DEGREES)
No of obs 429
Mean 55.6665
Standard dev 2.908152e-02
Max value 55.7152
Min value 55.6163

CORRECTED LONGITUDE (DEGREES)
No of obs 429
Mean -11.9169
Standard dev 0.153690
Max value -11.6508
Min value -12.1816

NORTHWARD WIND COMPT (M S-1)
No of obs 429
Mean -7.87126
Standard dev 0.442960
Max value -6.52467
Min value -9.10201

EASTWARD WIND COMPT (M S-1)
No of obs 429
Mean 20.1452
Standard dev 0.435937
Max value 21.1613
Min value 19.1954

VERTICAL WIND COMPT (M S-1)
No of obs 429
Mean 0.148370
Standard dev 0.429728
Max value 0.886299
Min value -1.15054

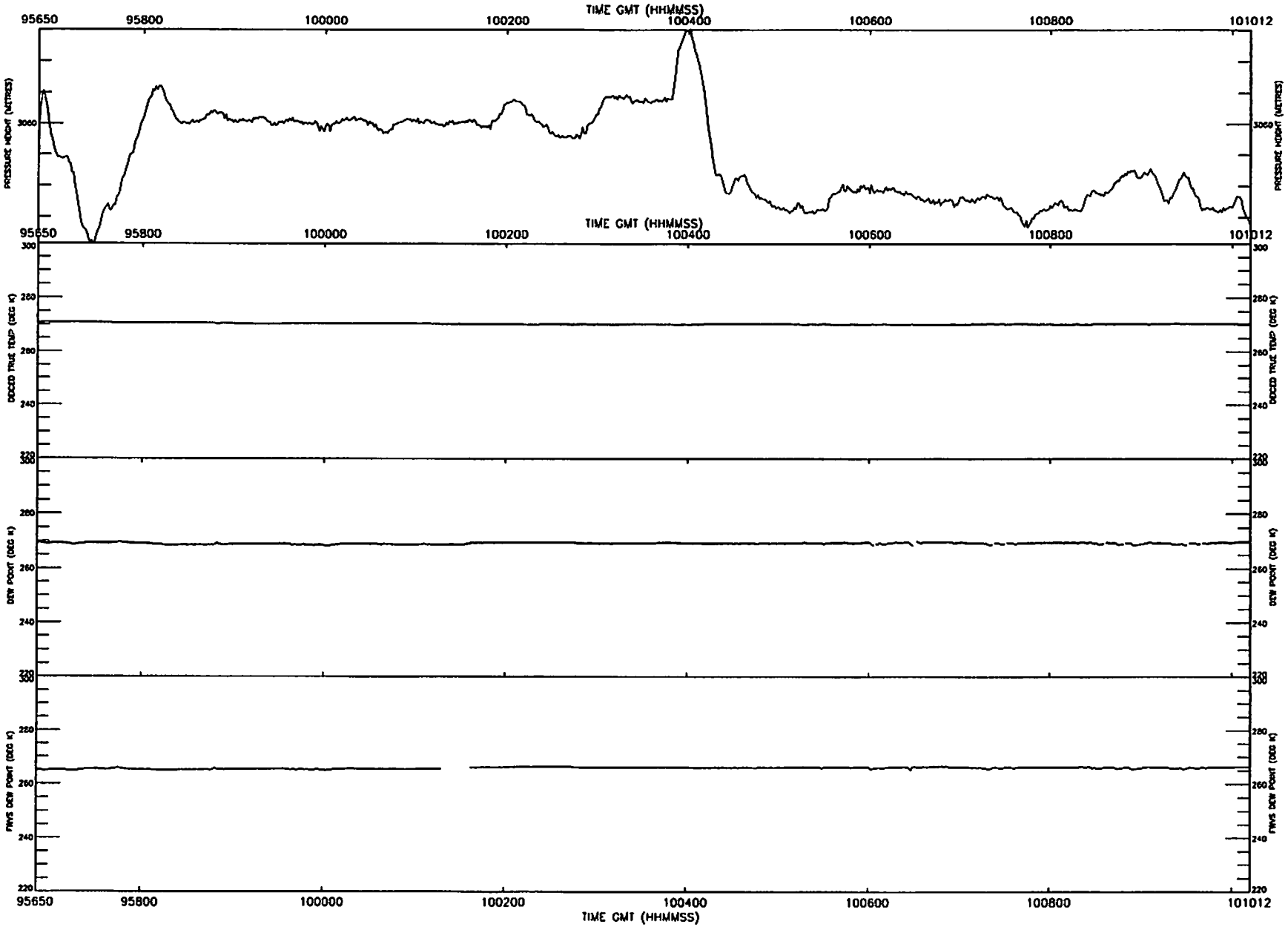
WIND SPEED (MS-1)
No of obs 429
Mean 21.6314
Standard dev 0.502047
Max value 22.9788
Min value 20.6895

WIND DIRECTION (DEG)
Mean 291.342

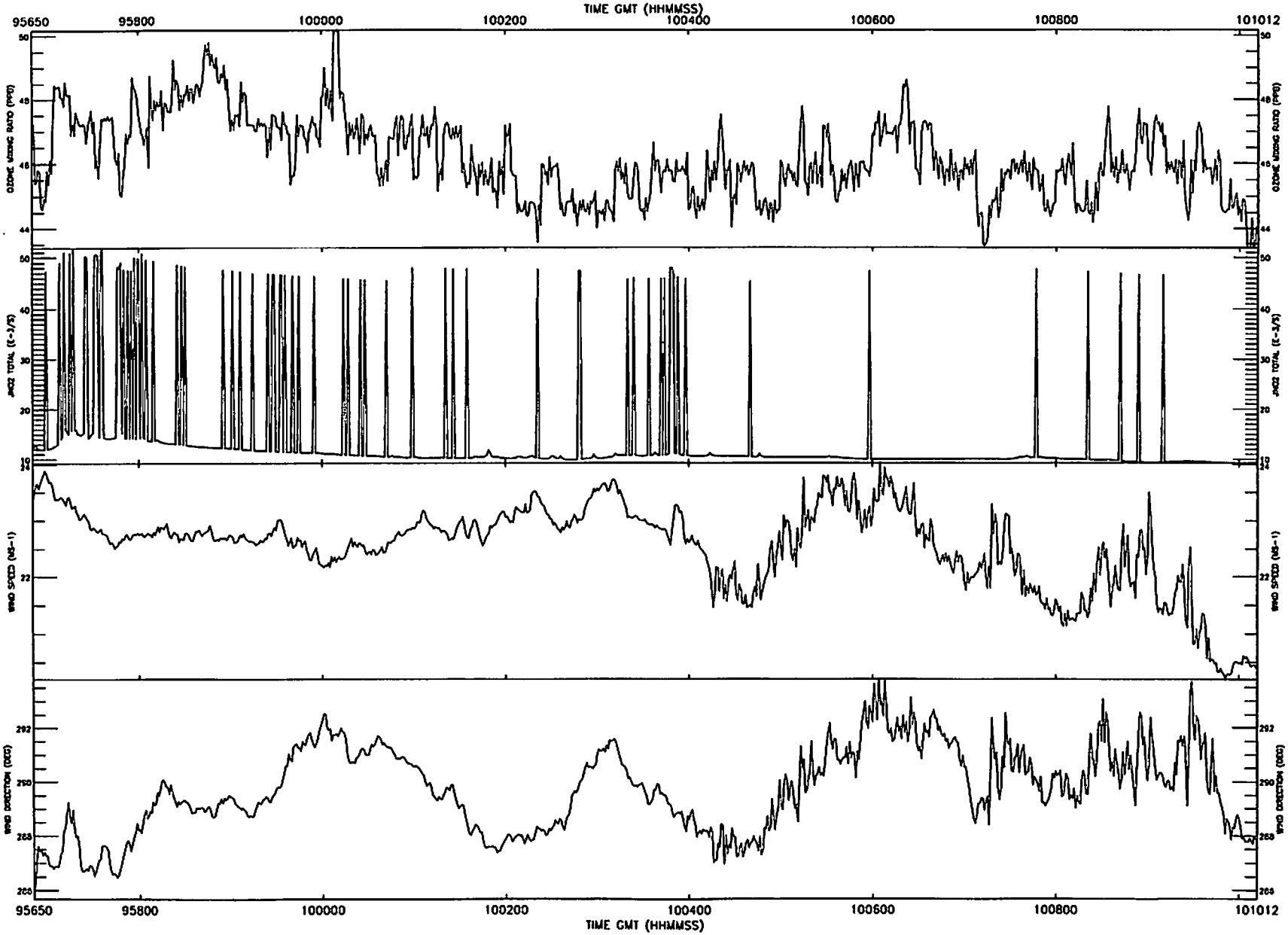
TRUE AIR SPEED (M S-1)
No of obs 429
Mean 99.4314
Standard dev 1.03722
Max value 101.524
Min value 95.1982

HEADING (DEG)
Mean 251.753

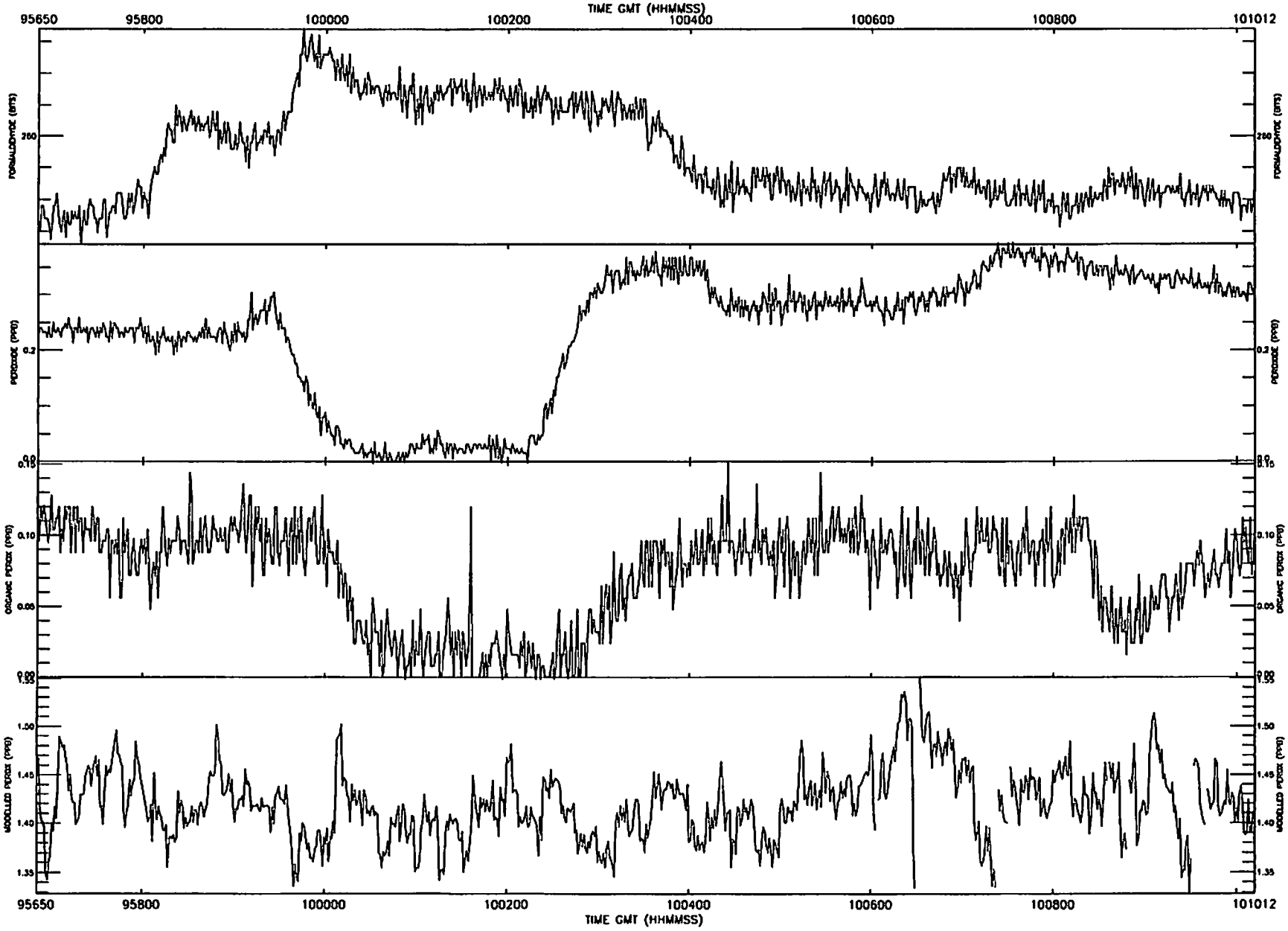
A533 05-APR-97 R6 FL100 From 95650-101012 *Plotted 19-Jun-1997 08:53*



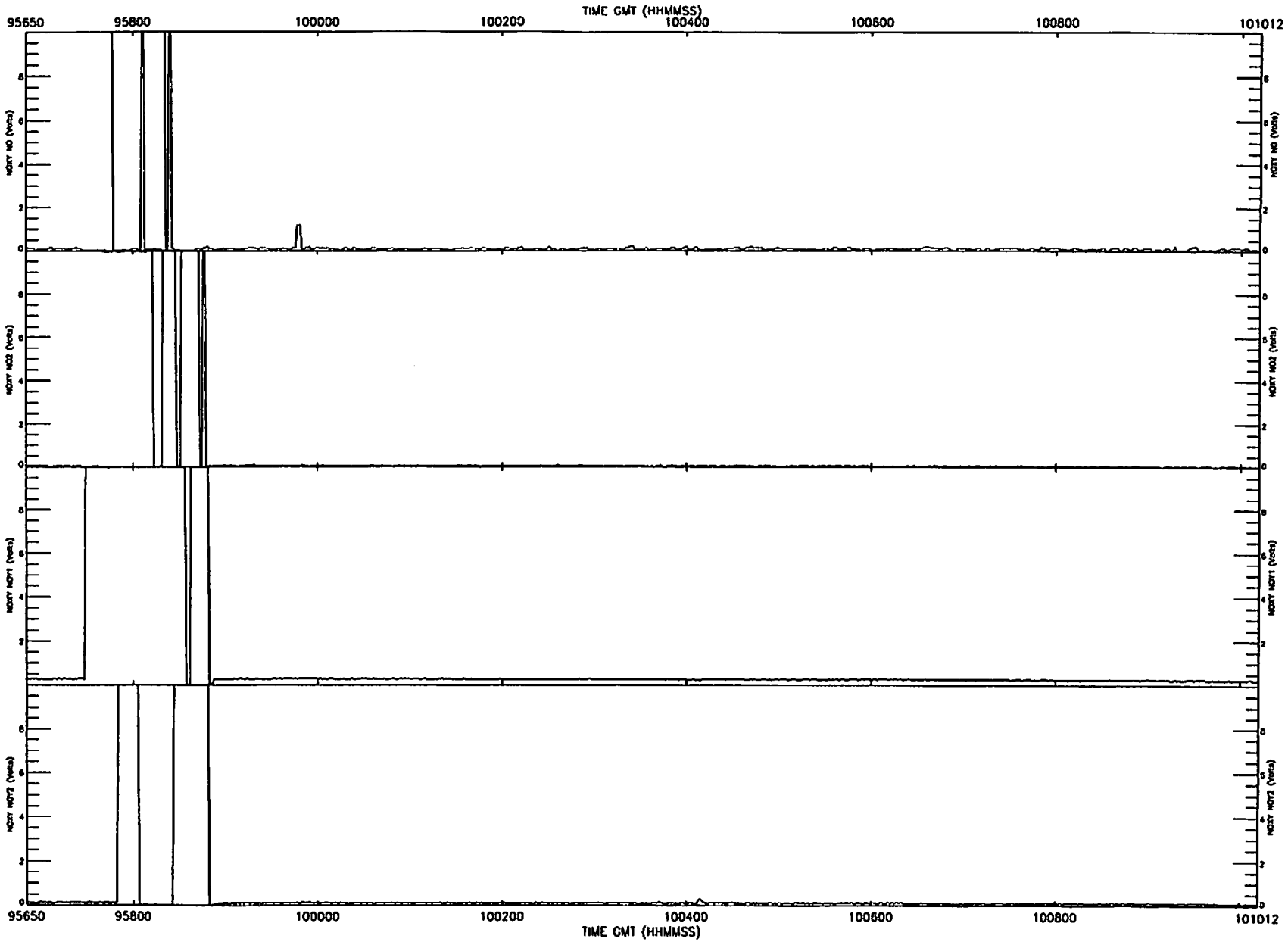
A533 05-APR-97 R6 FL100 From 95650-101012 *Plotted 19-Jun-1997 08:53*



A533 05-APR-97 R6 FL100 From 95650-101012 *Plotted 6-Jun-1997 16:49*



A533 05-APR-97 R6 FL100 From 95650-101012 *Plotted 6-Jun-1997 16:50*



A533 05-APR-97 R6 FL100 From 95650-101012 *Plotted 6-Jun-1997 16:50*

STATIC PRESSURE (MB)
No of obs 803
Mean 696.211
Standard dev 0.639922
Max value 697.455
Min value 694.410

DEICED TRUE TEMP (DEG K)
No of obs 803
Mean 270.365
Standard dev 0.172819
Max value 270.943
Min value 270.106

DEW POINT (DEG K)
No of obs 803
Mean 269.258
Standard dev 0.295718
Max value 270.065
Min value 268.387

OZONE MIXING RATIO (PPB)
No of obs 803
Mean 46.1757
Standard dev 1.23656
Max value 50.1595
Min value 43.3801

JNO2 TOTAL (E-3/S)
No of obs 803
Mean 13.7694
Standard dev 10.3594
Max value 51.3845
Min value 9.09481

PEROXIDE (PPB)
No of obs 803
Mean 0.238705
Standard dev 0.114301
Max value 0.392000
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 803
Mean 3054.78
Standard dev 7.21809
Max value 3075.12
Min value 3040.75

CORRECTED LATITUDE (DEGREES)
No of obs 803
Mean 55.4344
Standard dev 7.208925e-02
Max value 55.5507
Min value 55.3073

CORRECTED LONGITUDE (DEGREES)
No of obs 803
Mean -13.0992
Standard dev 0.318590
Max value -12.5556
Min value -13.6557

NORTHWARD WIND COMPT (M S-1)
No of obs 803
Mean -7.61142
Standard dev 0.647851
Max value -6.22020
Min value -9.62280

EASTWARD WIND COMPT (M S-1)
No of obs 803
Mean 21.2164
Standard dev 0.722136
Max value 22.8086
Min value 19.0989

VERTICAL WIND COMPT (M S-1)
No of obs 803
Mean 0.293788
Standard dev 0.449129
Max value 1.19840
Min value -1.43594

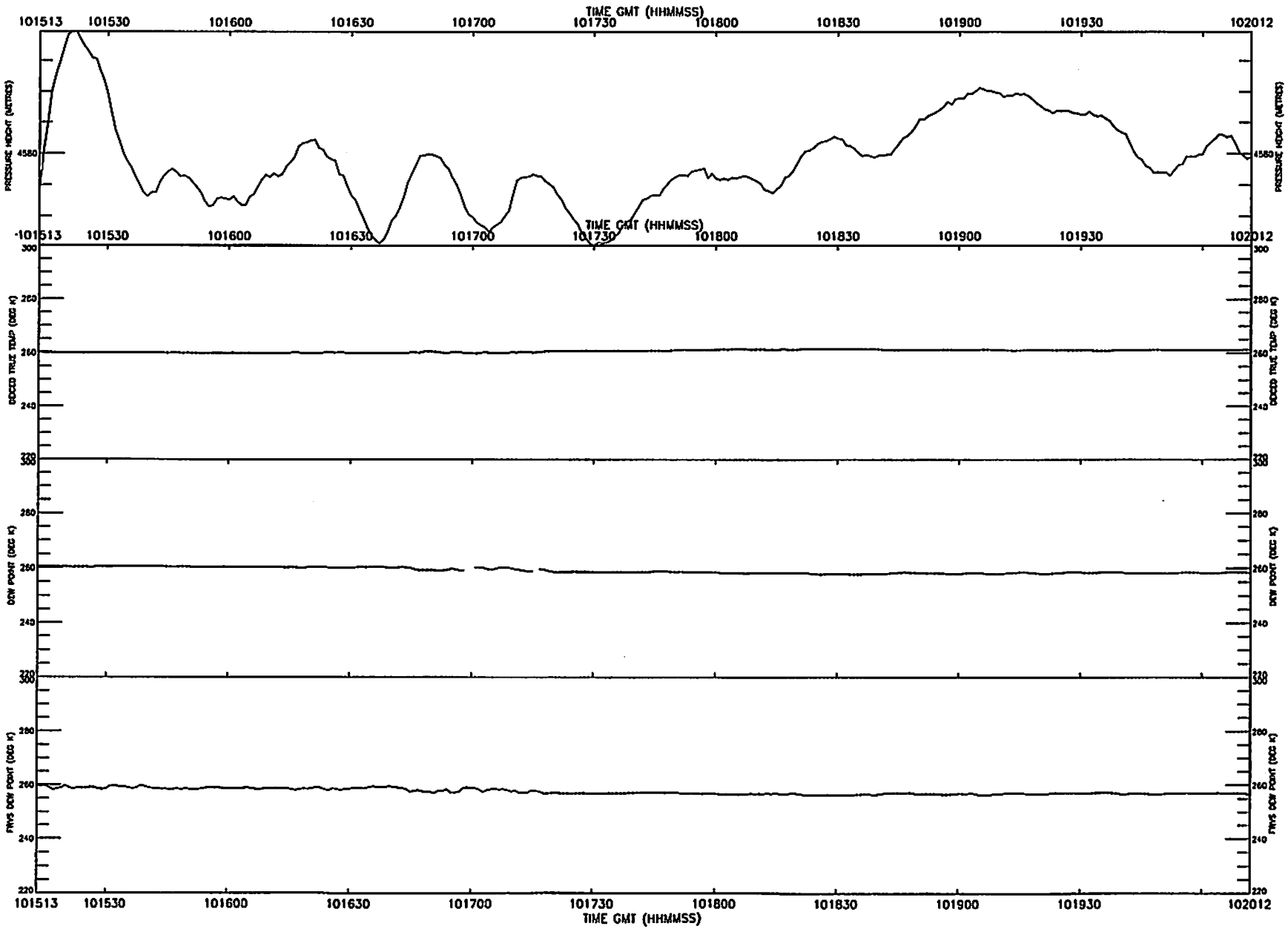
WIND SPEED (MS-1)
No of obs 803
Mean 22.5488
Standard dev 0.749501
Max value 24.0211
Min value 20.2061

WIND DIRECTION (DEG)
Mean 289.736

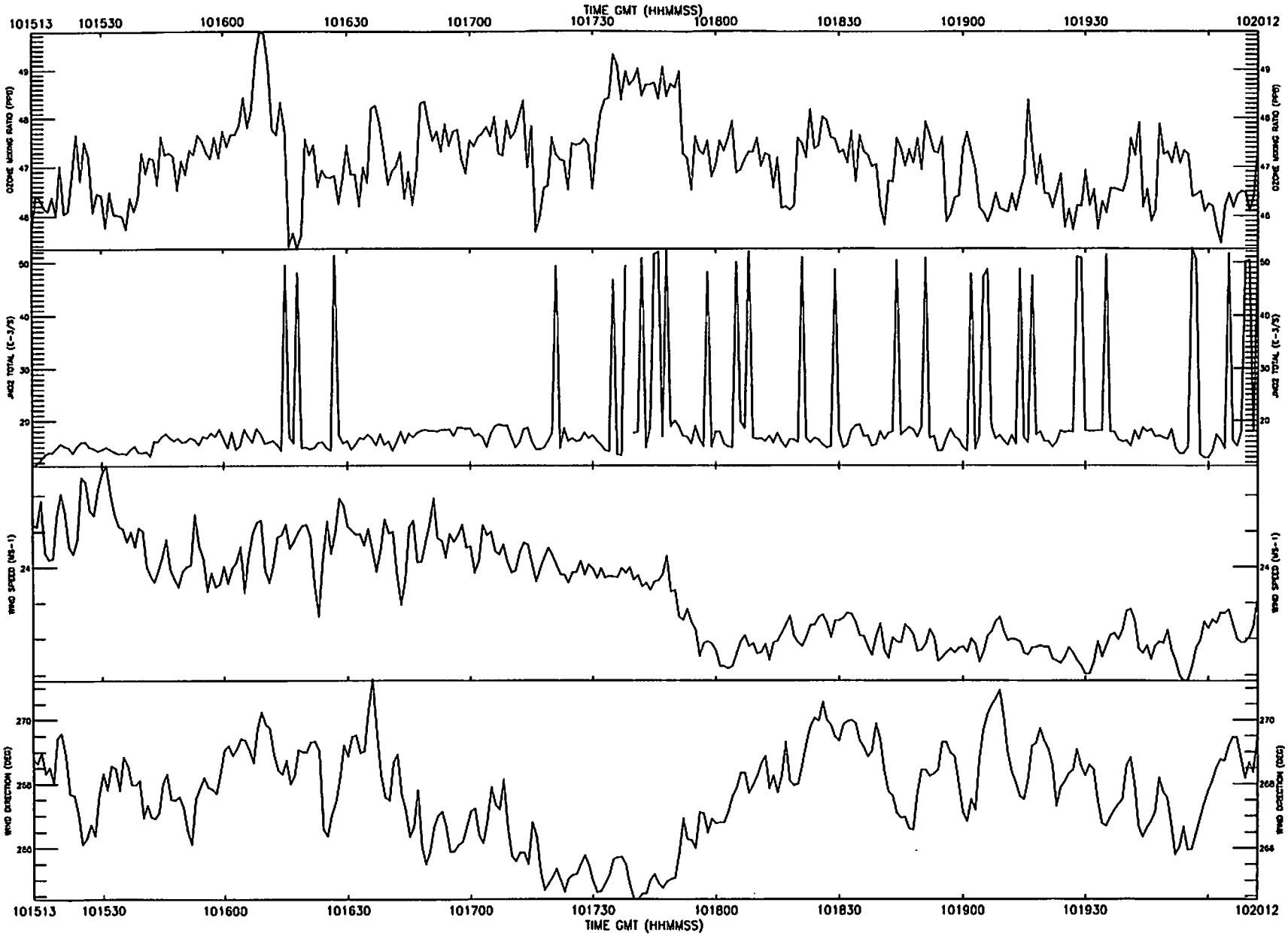
TRUE AIR SPEED (M S-1)
No of obs 803
Mean 110.903
Standard dev 2.62230
Max value 115.223
Min value 106.340

HEADING (DEG)
Mean 248.732

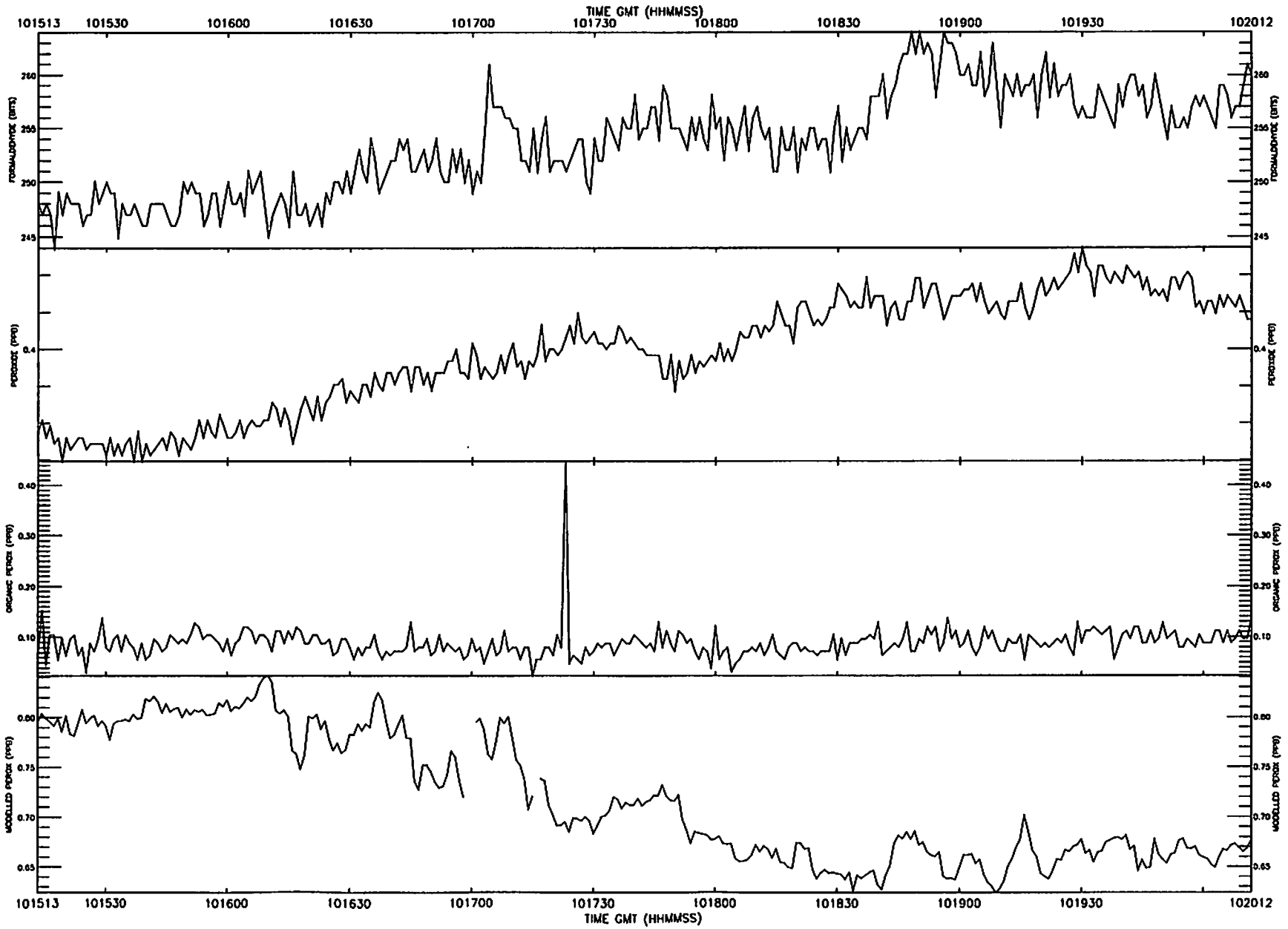
A533 05-APR-97 R7 FL150 From 101513-102012 *Plotted 19-Jun-1997 08:54*



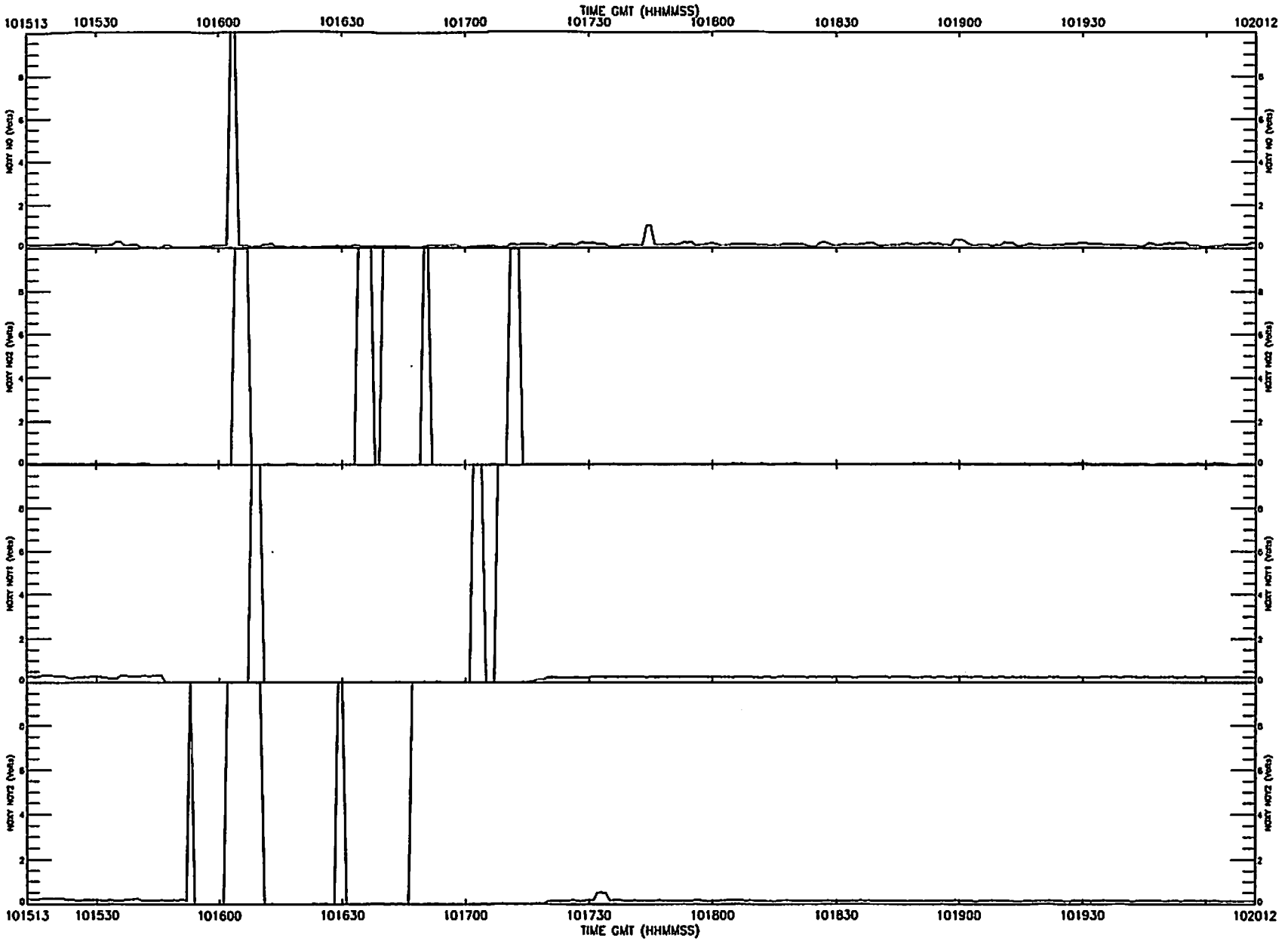
A533 05-APR-97 R7 FL150 From 101513-102012 *Plotted 19-Jun-1997 08:54*



A533 05-APR-97 R7 FL150 From 101513-102012 *Plotted 6-Jun-1997 16:50*



A533 05-APR-97 R7 FL150 From 101513-102012 *Plotted 6-Jun-1997 16:50*



A533 05-APR-97 R7 FL150 From 101513-102012 *Plotted 6-Jun-1997 16:51*

STATIC PRESSURE (MB)
No of obs 300
Mean 571.289
Standard dev 0.539647
Max value 572.317
Min value 569.726

DEICED TRUE TEMP (DEG K)
No of obs 300
Mean 260.633
Standard dev 0.536143
Max value 261.410
Min value 259.812

DEW POINT (DEG K)
No of obs 300
Mean 259.059
Standard dev 0.951699
Max value 260.573
Min value 257.672

OZONE MIXING RATIO (PPB)
No of obs 300
Mean 47.1085
Standard dev 0.831247
Max value 49.7716
Min value 45.3332

JNO2 TOTAL (E-3/S)
No of obs 300
Mean 20.0913
Standard dev 10.6469
Max value 53.1770
Min value 11.4120

PEROXIDE (PPB)
No of obs 300
Mean 0.395173
Standard dev 7.626013e-02
Max value 0.536000
Min value 0.248000

PRESSURE HEIGHT (METRES)
No of obs 300
Mean 4578.94
Standard dev 7.14531
Max value 4599.66
Min value 4565.35

CORRECTED LATITUDE (DEGREES)
No of obs 300
Mean 55.1694
Standard dev 2.557718e-02
Max value 55.2125
Min value 55.1249

CORRECTED LONGITUDE (DEGREES)
No of obs 300
Mean -14.2815
Standard dev 0.129101
Max value -14.0626
Min value -14.5050

NORTHWARD WIND COMPT (M S-1)
No of obs 300
Mean 0.962038
Standard dev 0.617055
Max value 2.32682
Min value -0.521133

EASTWARD WIND COMPT (M S-1)
No of obs 300
Mean 23.6065
Standard dev 0.705764
Max value 25.4005
Min value 22.3744

VERTICAL WIND COMPT (M S-1)
No of obs 300
Mean -0.105525
Standard dev 0.836489
Max value 1.13803
Min value -2.64005

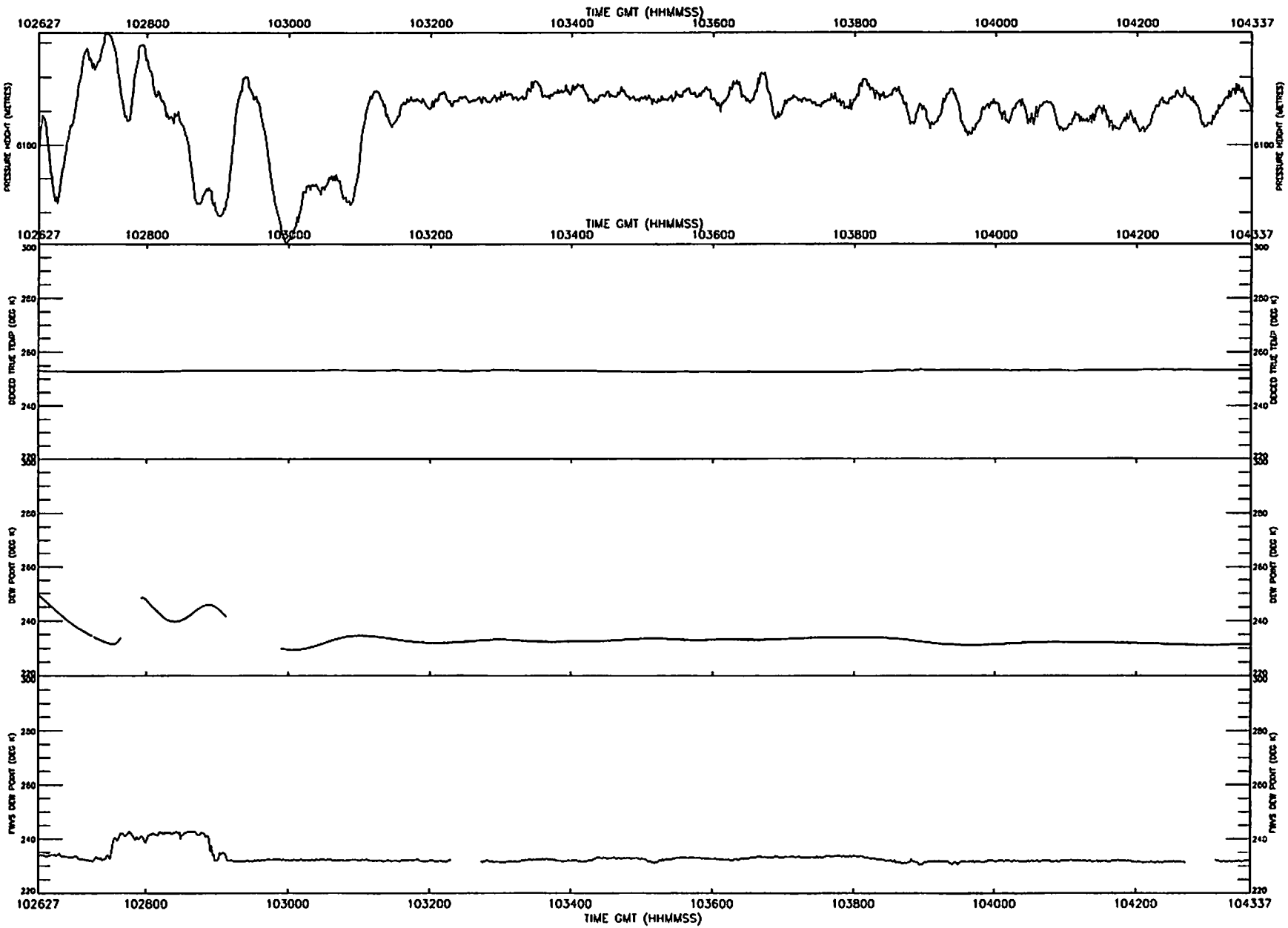
WIND SPEED (MS-1)
No of obs 300
Mean 23.6340
Standard dev 0.710379
Max value 25.4187
Min value 22.4239

WIND DIRECTION (DEG)
Mean 267.666

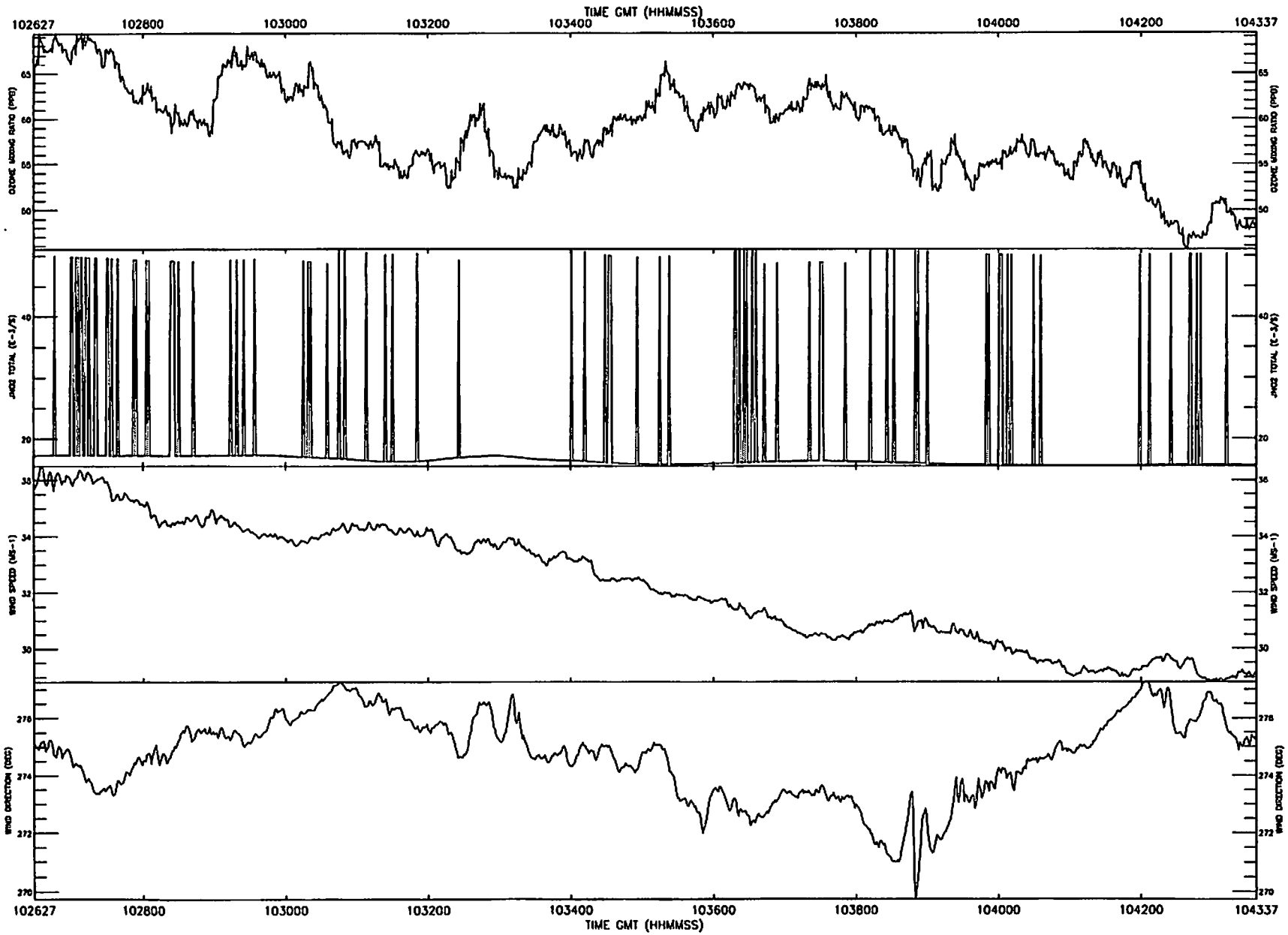
TRUE AIR SPEED (M S-1)
No of obs 300
Mean 122.347
Standard dev 2.70352
Max value 124.499
Min value 110.298

HEADING (DEG)
Mean 250.918

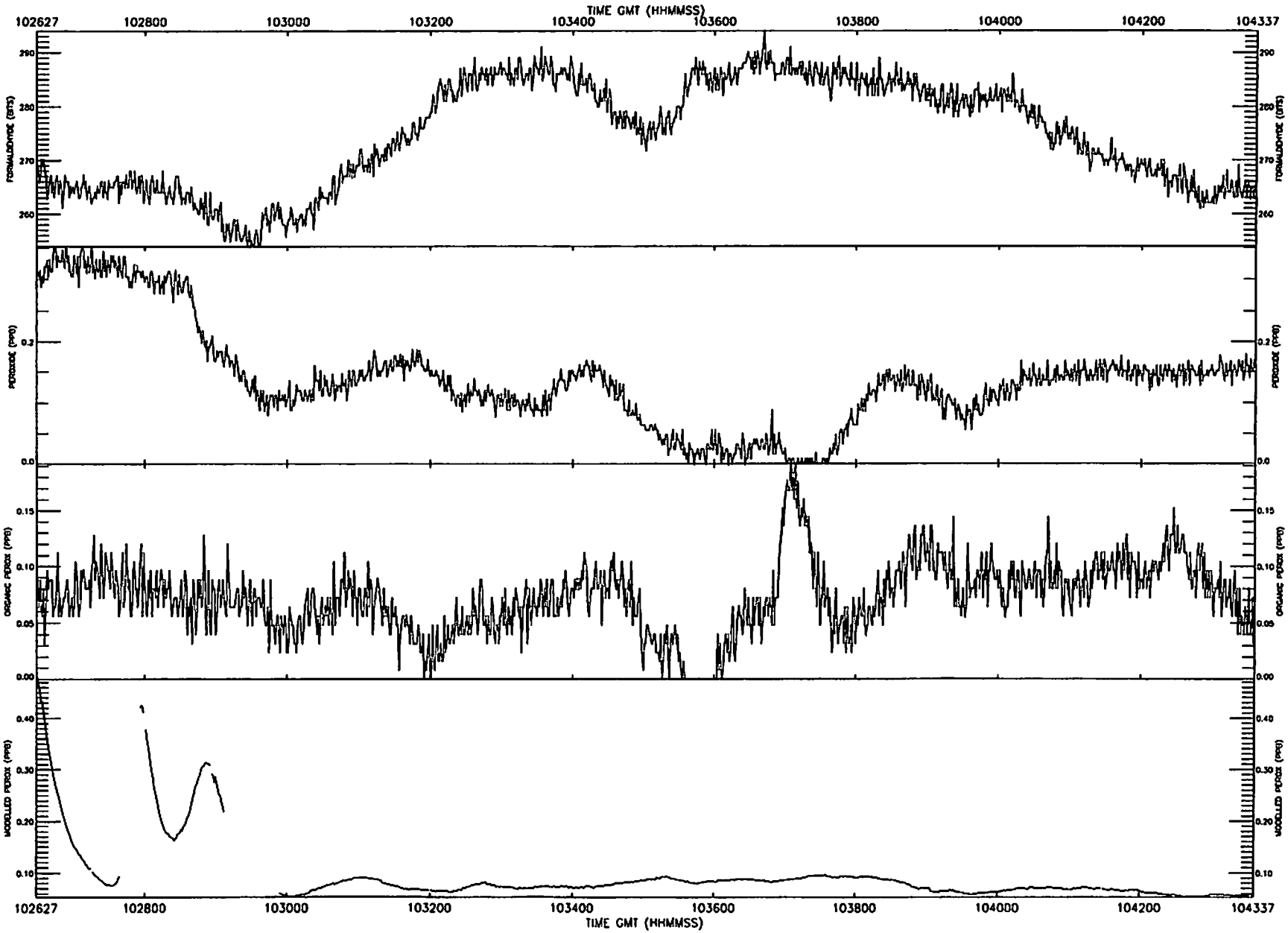
A533 05-APR-97 R8 FL200 From 102627-104337 *Plotted 19-Jun-1997 08:57*



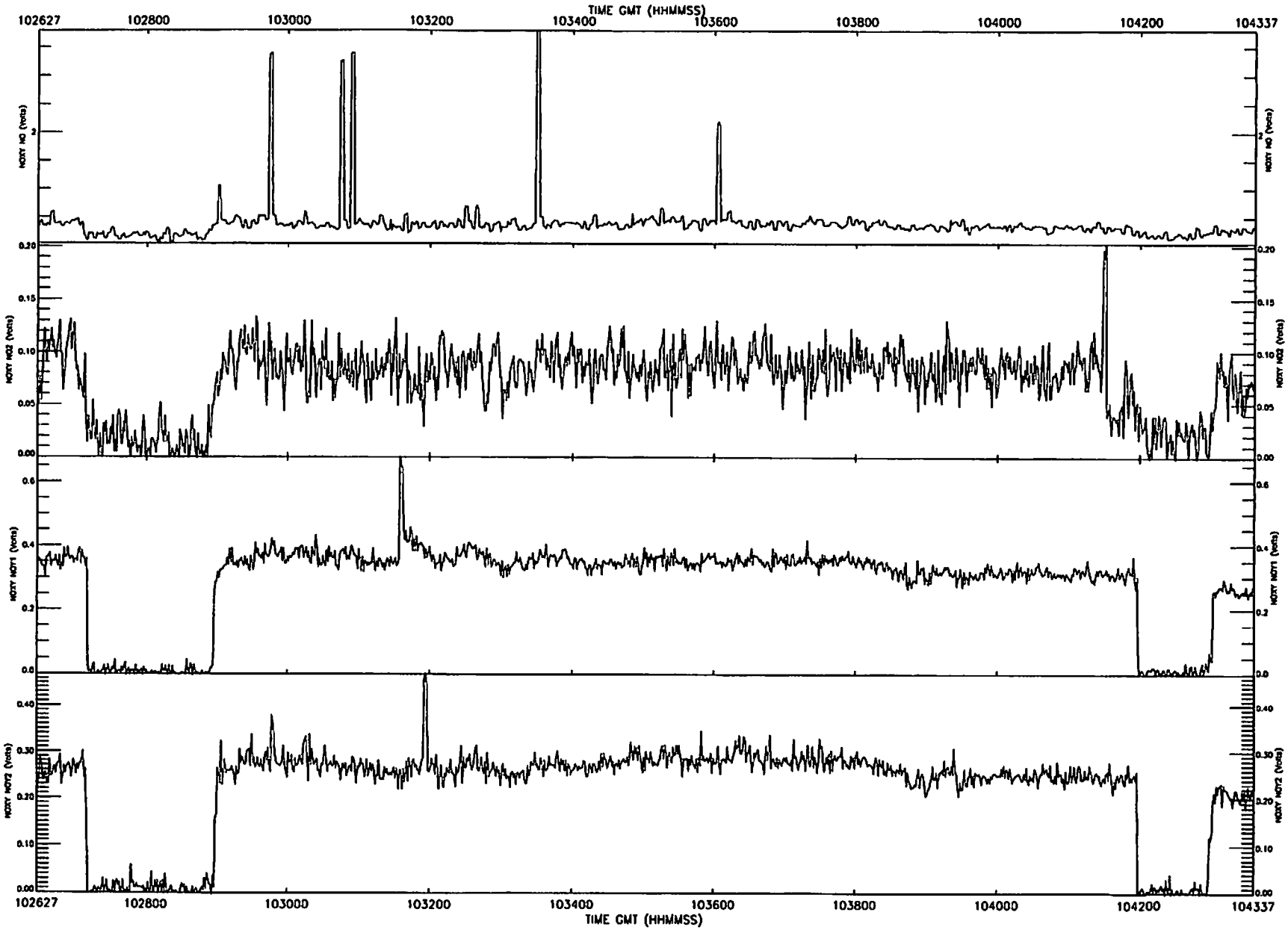
A533 05-APR-97 R8 FL200 From 102627-104337 *Plotted 19-Jun-1997 08:57*



A533 05-APR-97 R8 FL200 From 102627-104337 *Plotted 6-Jun-1997 16:54*



A533 05-APR-97 R8 FL200 From 102627-104337 *Plotted 6-Jun-1997 16:54*



A533 05-APR-97 R8 FL200 From 102627-104337 *Plotted 6-Jun-1997 16:54*

STATIC PRESSURE (MB)
No of obs 1031
Mean 465.073
Standard dev 0.339246
Max value 466.307
Min value 464.318

DEICED TRUE TEMP (DEG K)
No of obs 1031
Mean 253.062
Standard dev 0.231955
Max value 253.593
Min value 252.583

DEW POINT (DEG K)
No of obs 1031
Mean 233.937
Standard dev 3.77224
Max value 249.461
Min value 229.400

OZONE MIXING RATIO (PPB)
No of obs 1031
Mean 58.2649
Standard dev 6.55644
Max value 69.3600
Min value 1.000000e-38

JNO2 TOTAL (E-3/S)
No of obs 1031
Mean 18.7331
Standard dev 9.23335
Max value 53.5780
Min value 15.0879

PEROXIDE (PPB)
No of obs 1031
Mean 0.137451
Standard dev 8.244839e-02
Max value 0.352000
Min value 0.000000

PRESSURE HEIGHT (METRES)
No of obs 1031
Mean 6104.65
Standard dev 5.30254
Max value 6116.47
Min value 6085.37

CORRECTED LATITUDE (DEGREES)
No of obs 1031
Mean 54.4238
Standard dev 0.348104
Max value 54.9983
Min value 53.8117

CORRECTED LONGITUDE (DEGREES)
No of obs 1031
Mean -15.3536
Standard dev 0.239467
Max value -14.9698
Min value -15.7646

NORTHWARD WIND COMPT (M S-1)
No of obs 1031
Mean -2.64180
Standard dev 0.854647
Max value 0.135788
Min value -4.33119

EASTWARD WIND COMPT (M S-1)
No of obs 1031
Mean 32.1455
Standard dev 2.15824
Max value 36.3511
Min value 28.6473

VERTICAL WIND COMPT (M S-1)
No of obs 1031
Mean 0.827874
Standard dev 0.778017
Max value 3.16579
Min value -3.10506

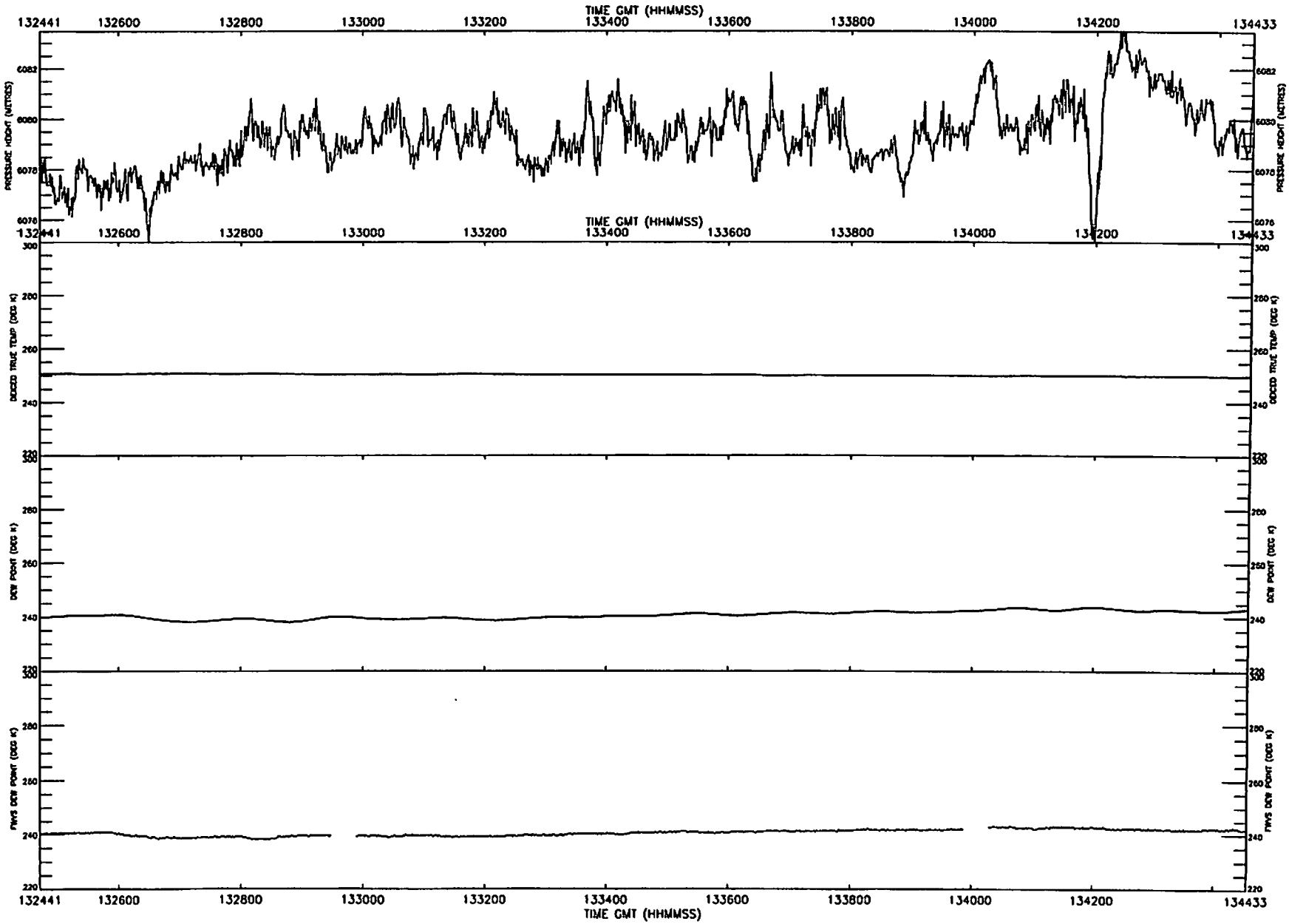
WIND SPEED (MS-1)
No of obs 1031
Mean 32.2639
Standard dev 2.17701
Max value 36.4995
Min value 28.8188

WIND DIRECTION (DEG)
Mean 274.698

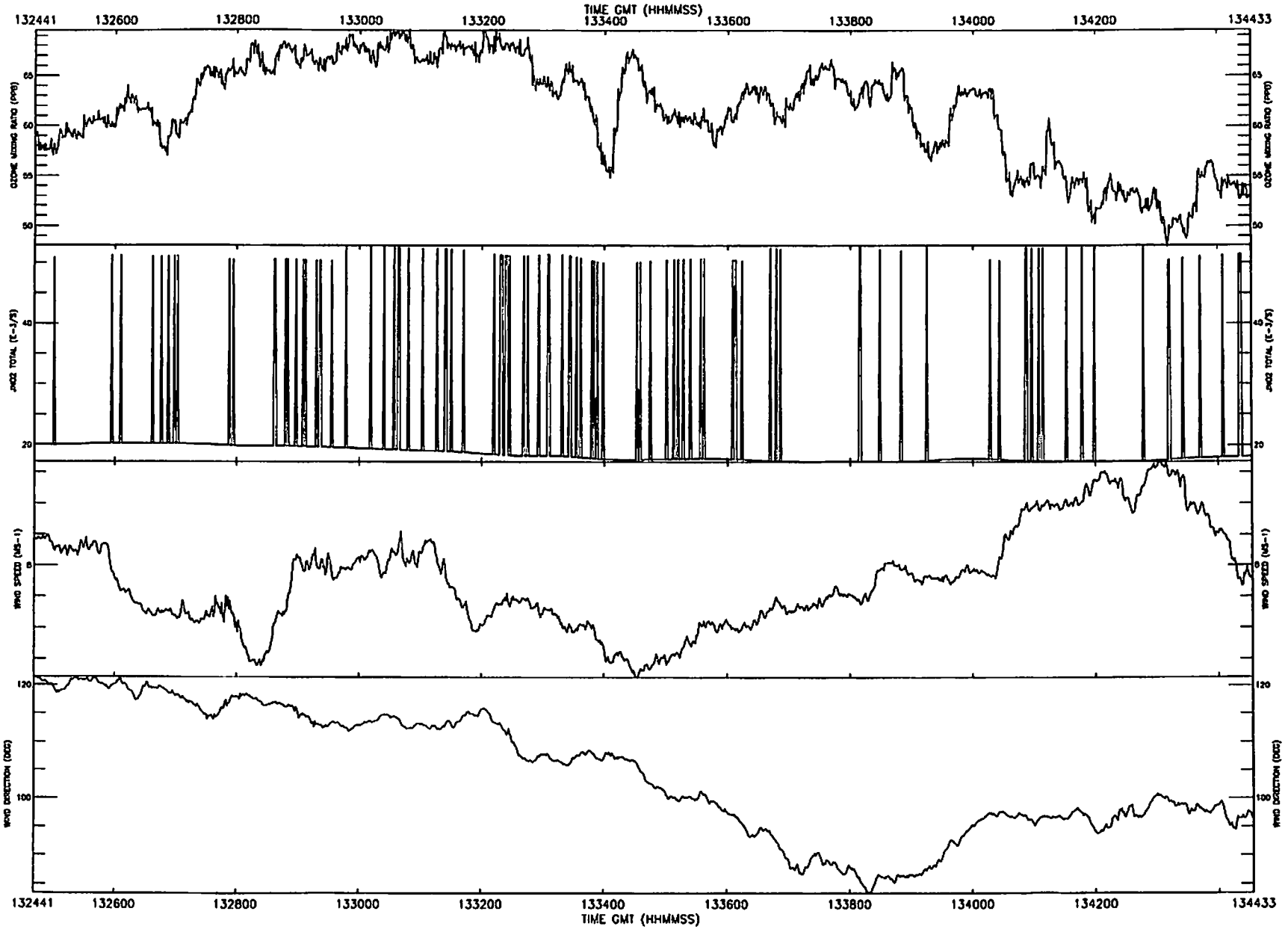
TRUE AIR SPEED (M S-1)
No of obs 1031
Mean 150.179
Standard dev 9.91324
Max value 157.243
Min value 112.725

HEADING (DEG)
Mean 201.343

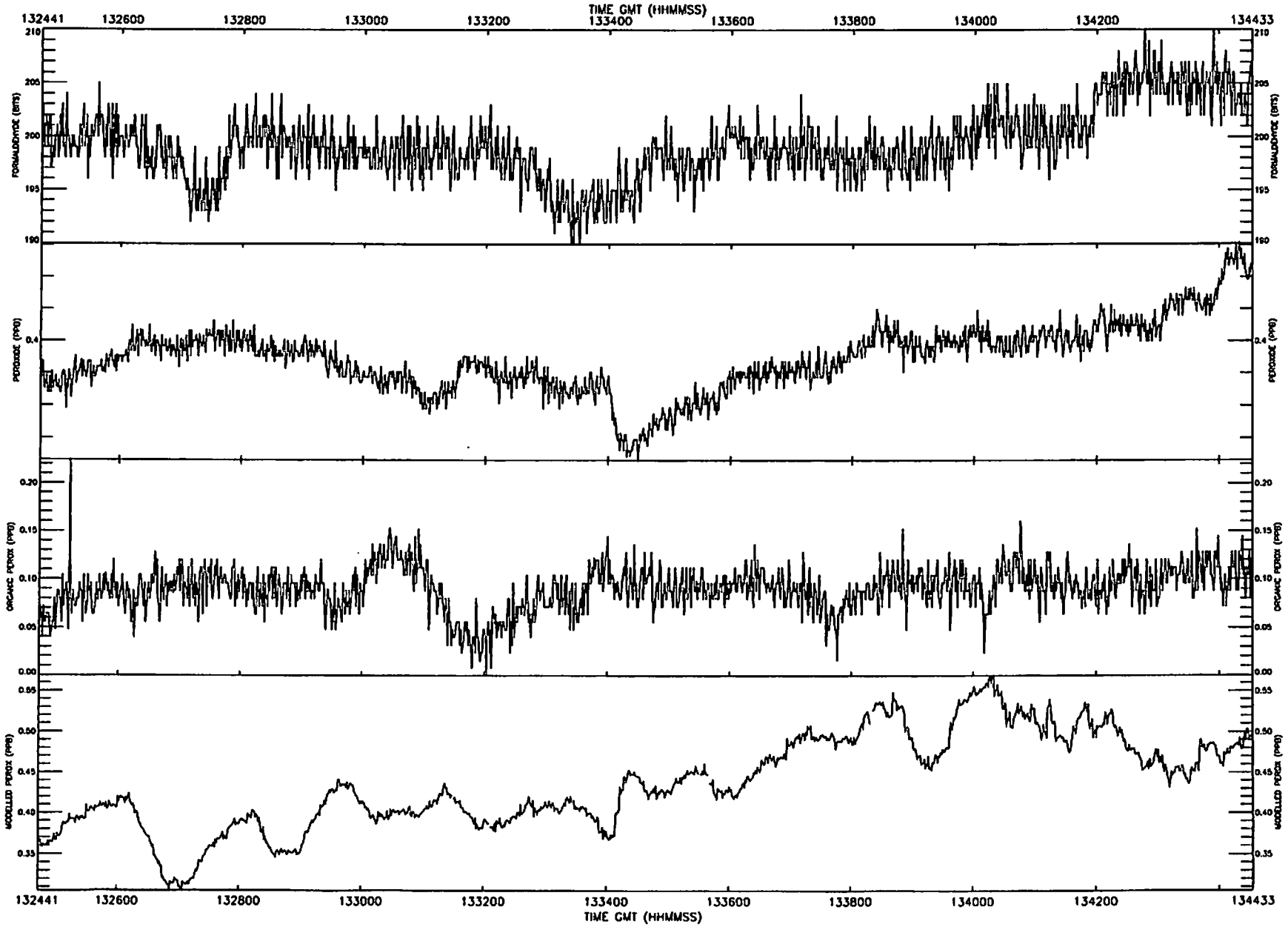
A533 05-APR-97 R9 FL200 From 132441-134433 *Plotted 19-Jun-1997 08:59*



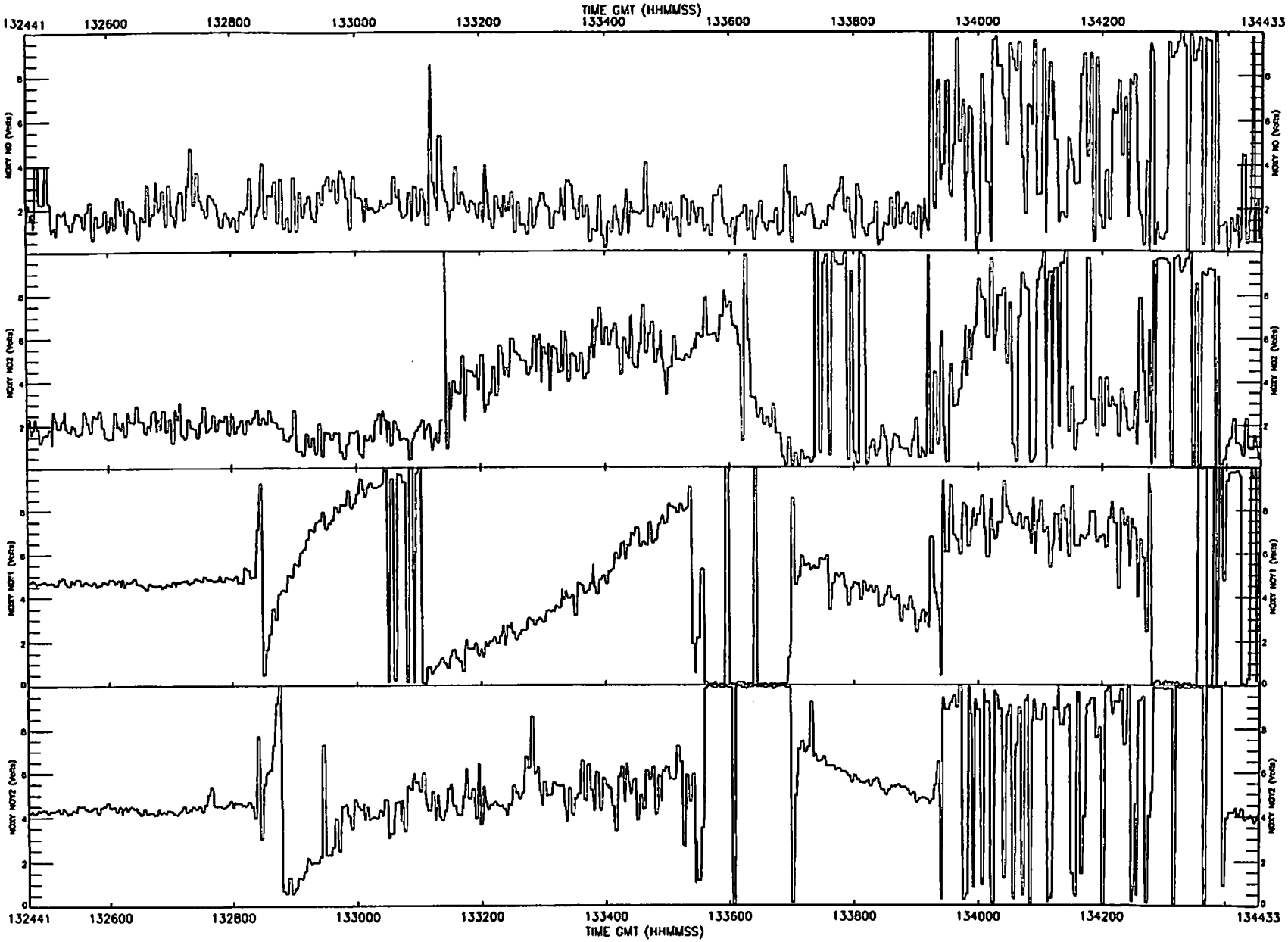
A533 05-APR-97 R9 FL200 From 132441-134433 *Plotted 19-Jun-1997 08:59*



A533 05-APR-97 R9 FL200 From 132441-134433 *Plotted 6-Jun-1997 16:57*



A533 05-APR-97 R9 FL200 From 132441-134433 *Plotted 6-Jun-1997 16:57*



A533 05-APR-97 R9 FL200 From 132441-134433 *Plotted 6-Jun-1997 16:57*

STATIC PRESSURE (MB)
No of obs 1193
Mean 466.696
Standard dev 8.303984e-02
Max value 466.965
Min value 466.429

DEICED TRUE TEMP (DEG K)
No of obs 1193
Mean 250.363
Standard dev 0.274100
Max value 250.868
Min value 250.014

DEW POINT (DEG K)
No of obs 1193
Mean 240.780
Standard dev 1.52444
Max value 243.649
Min value 238.057

OZONE MIXING RATIO (PPB)
No of obs 1193
Mean 61.2850
Standard dev 6.72478
Max value 69.5501
Min value 1.000000e-38

JNO2 TOTAL (E-3/S)
No of obs 1193
Mean 20.4613
Standard dev 8.75037
Max value 51.1255
Min value 16.7380

PEROXIDE (PPB)
No of obs 1193
Mean 0.372842
Standard dev 5.305034e-02
Max value 0.552000
Min value 0.216000

PRESSURE HEIGHT (METRES)
No of obs 1193
Mean 6079.30
Standard dev 1.29484
Max value 6083.46
Min value 6075.11

CORRECTED LATITUDE (DEGREES)
No of obs 1193
Mean 40.6900
Standard dev 0.472726
Max value 41.5115
Min value 39.8985

CORRECTED LONGITUDE (DEGREES)
No of obs 1193
Mean -22.7808
Standard dev 0.175753
Max value -22.5253
Min value -23.1829

NORTHWARD WIND COMPT (M S-1)
No of obs 1193
Mean 1.87937
Standard dev 1.39748
Max value 4.39805
Min value -0.865295

EASTWARD WIND COMPT (M S-1)
No of obs 1193
Mean -7.39838
Standard dev 0.926913
Max value -5.66239
Min value -9.51241

VERTICAL WIND COMPT (M S-1)
No of obs 1193
Mean 0.789812
Standard dev 0.279032
Max value 1.60181
Min value -0.208572

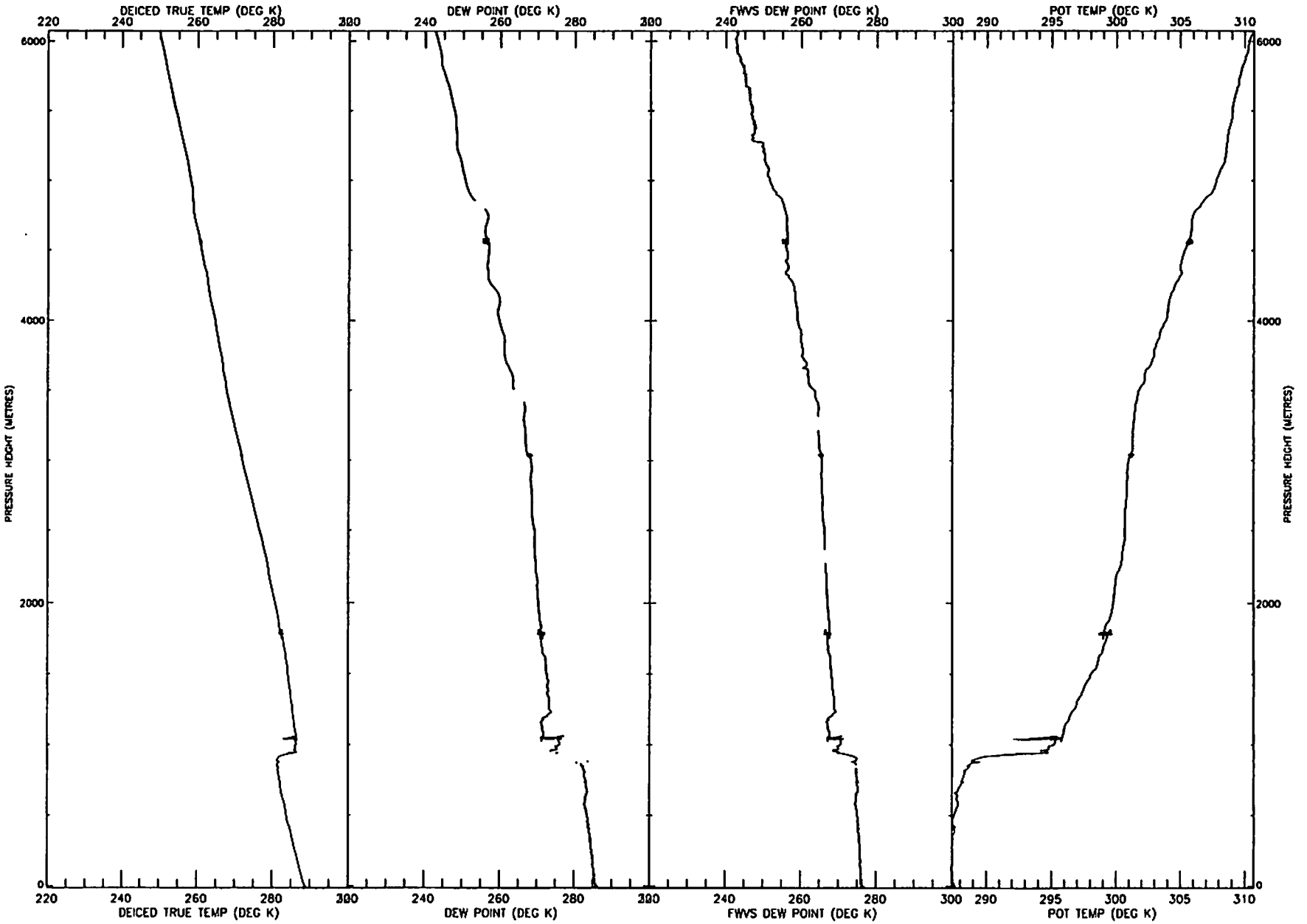
WIND SPEED (MS-1)
No of obs 1193
Mean 7.77364
Standard dev 0.805546
Max value 9.66836
Min value 6.20100

WIND DIRECTION (DEG)
Mean 104.253

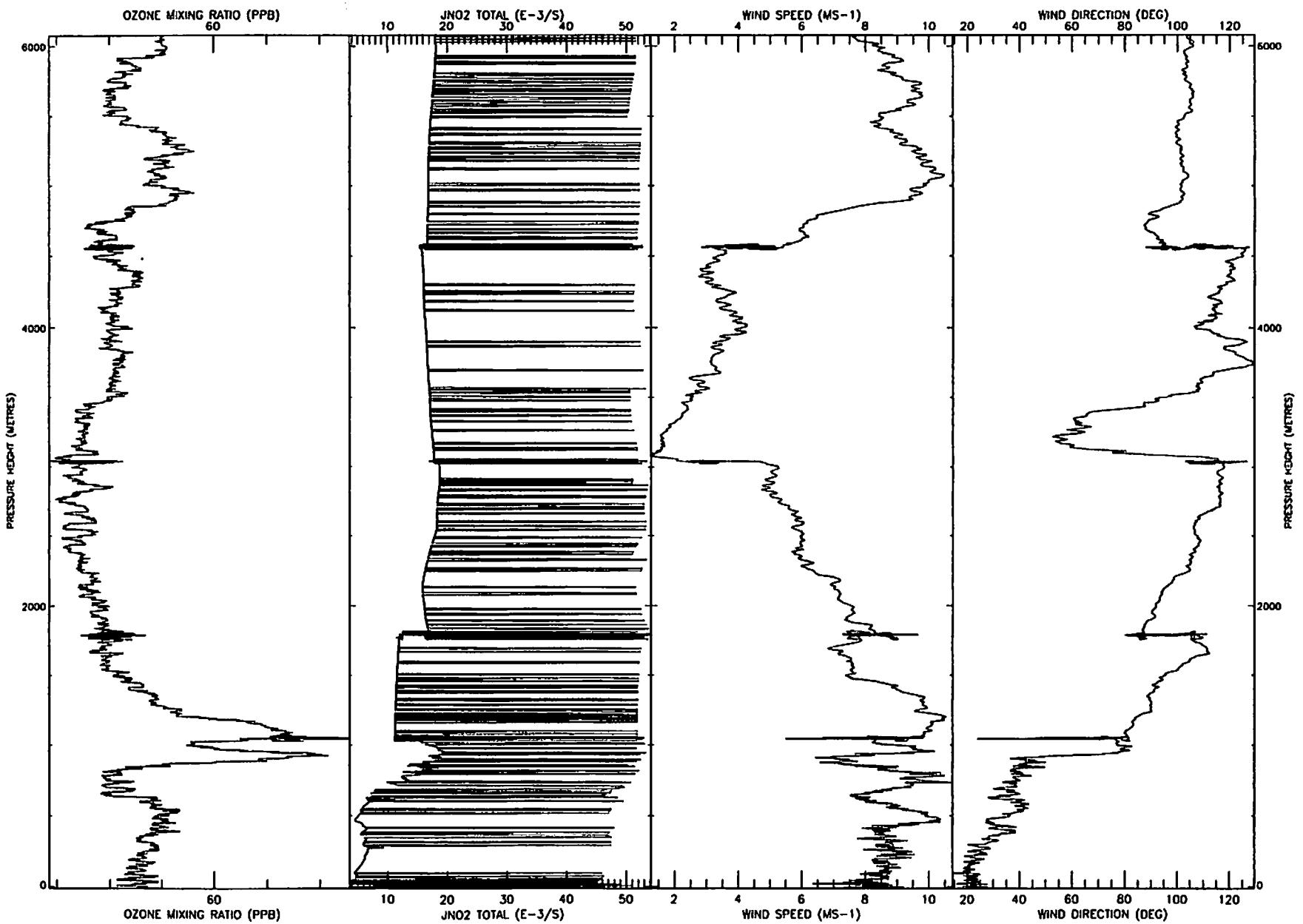
TRUE AIR SPEED (M S-1)
No of obs 1193
Mean 158.990
Standard dev 0.500406
Max value 160.159
Min value 156.500

HEADING (DEG)
Mean 197.299

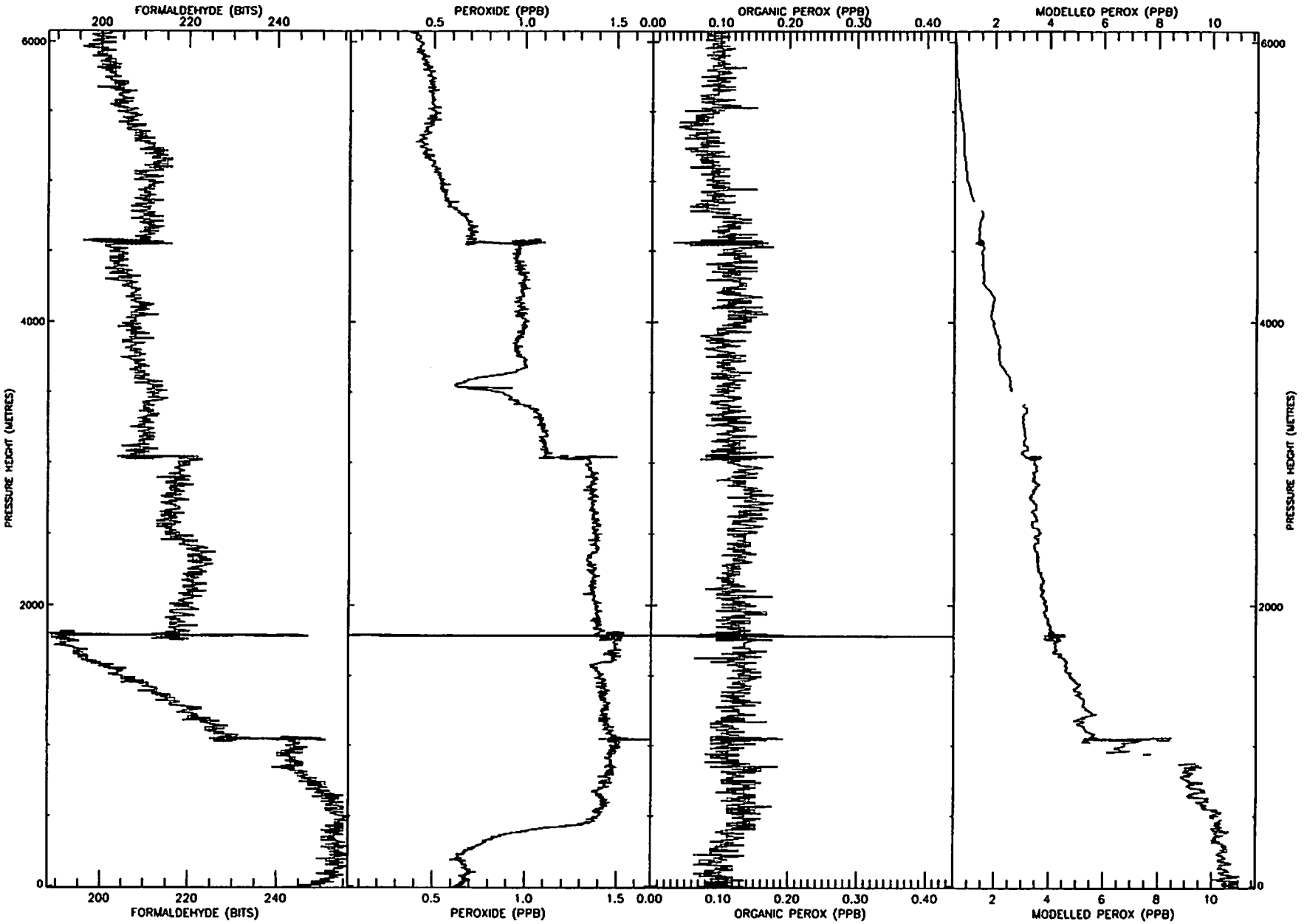
A533 05-APR-97 P3 FL200-50' From 134523-144717 *Plotted 19-Jun-1997 09:06*



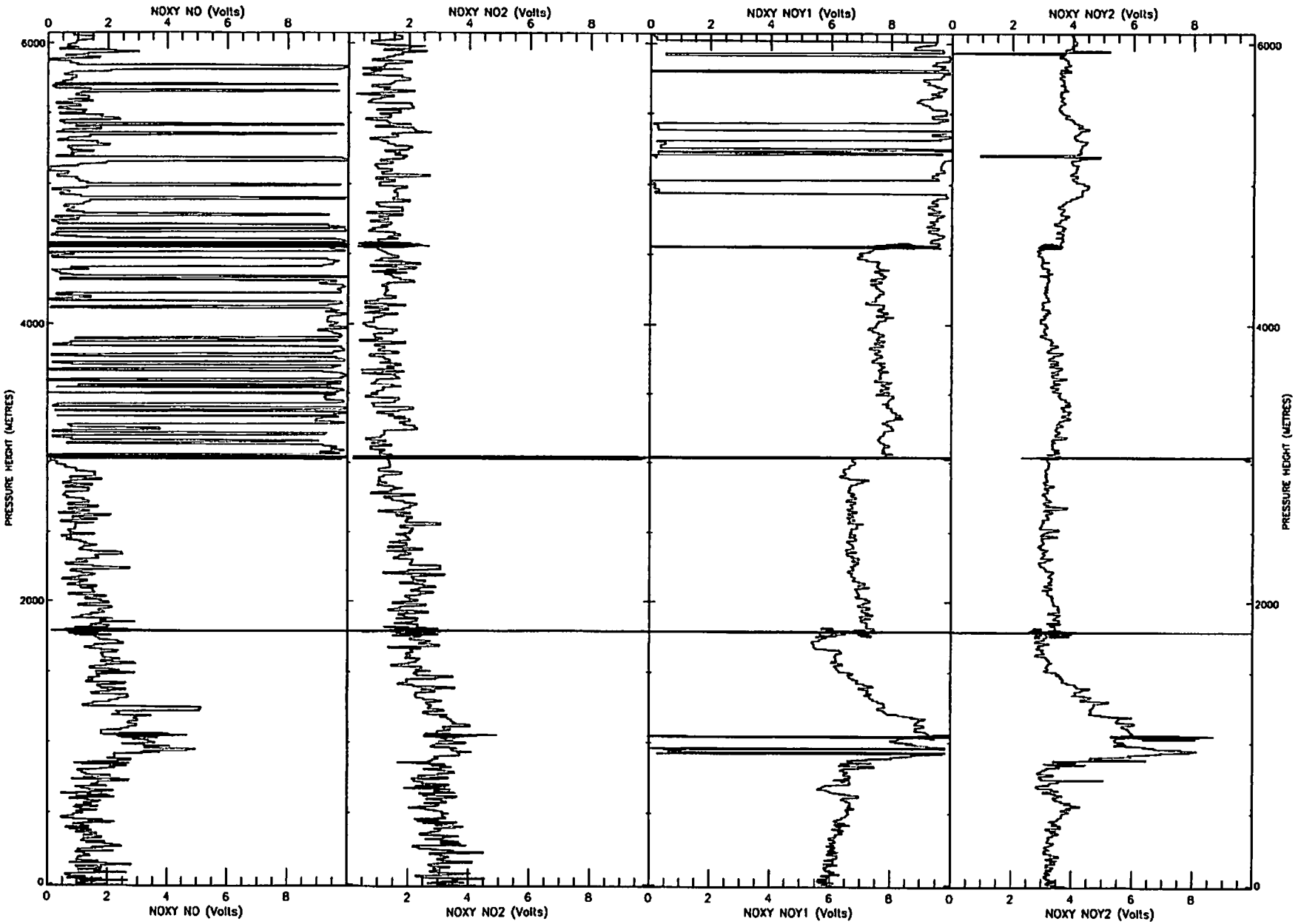
A533 05-APR-97 P3 FL200-50' From 134523-144717 *Plotted 19-Jun-1997 09:06*



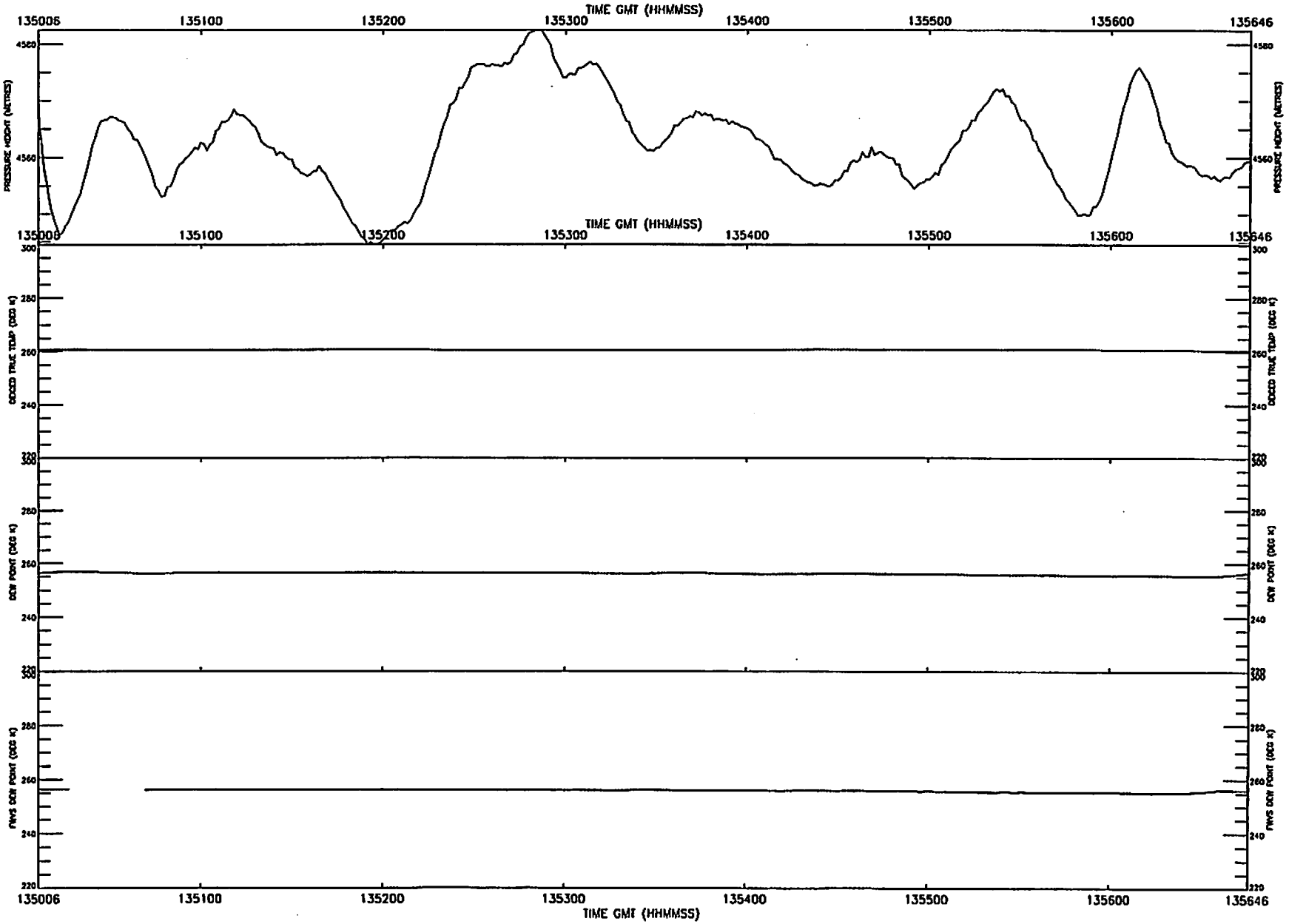
A533 05-APR-97 P3 FL200-50' From 134523-144717 *Plotted 6-Jun-1997 17:04*



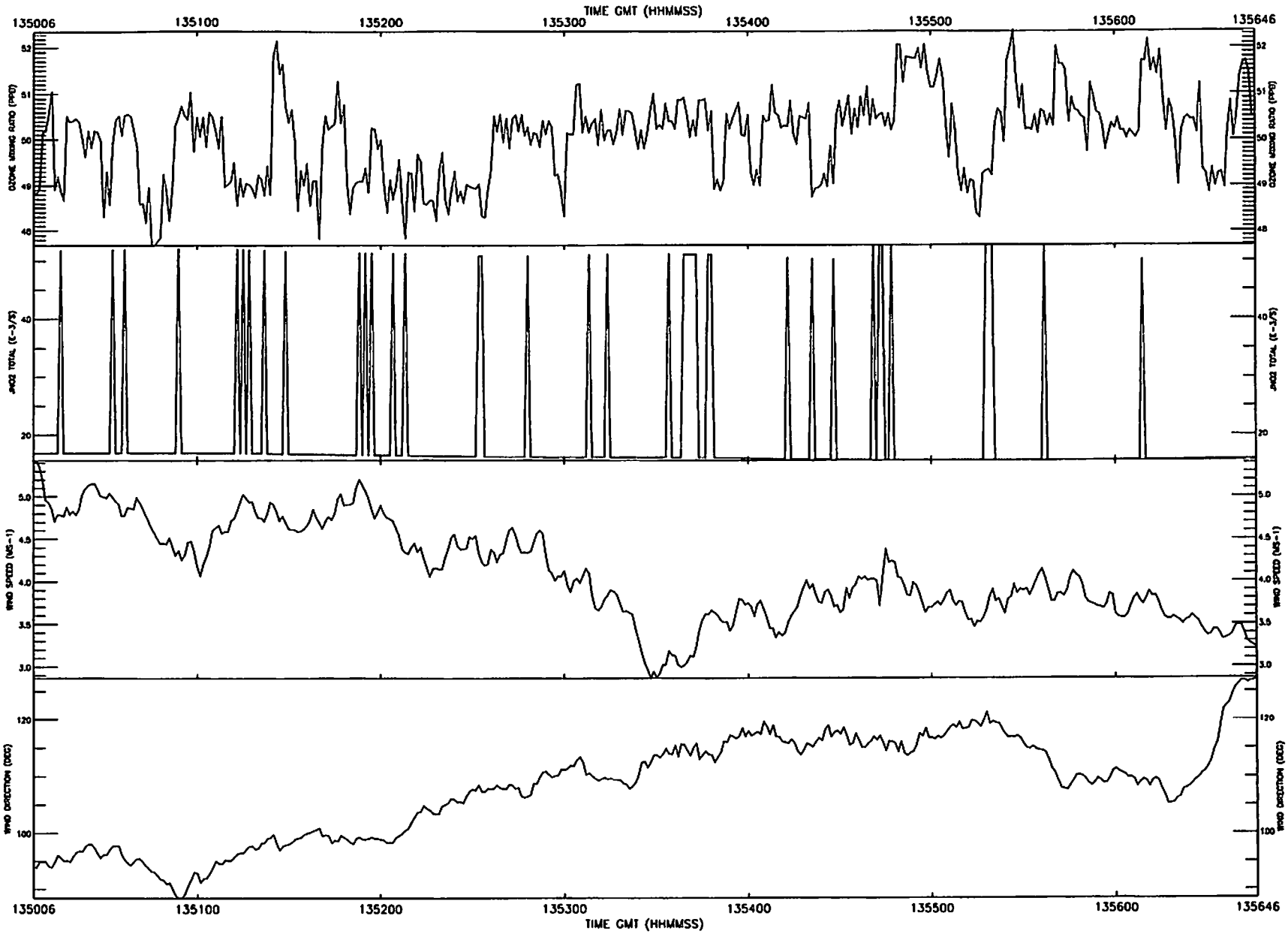
A533 05-APR-97 P3 FL200-50' From 134523-144717 *Plotted 6-Jun-1997 17:04*



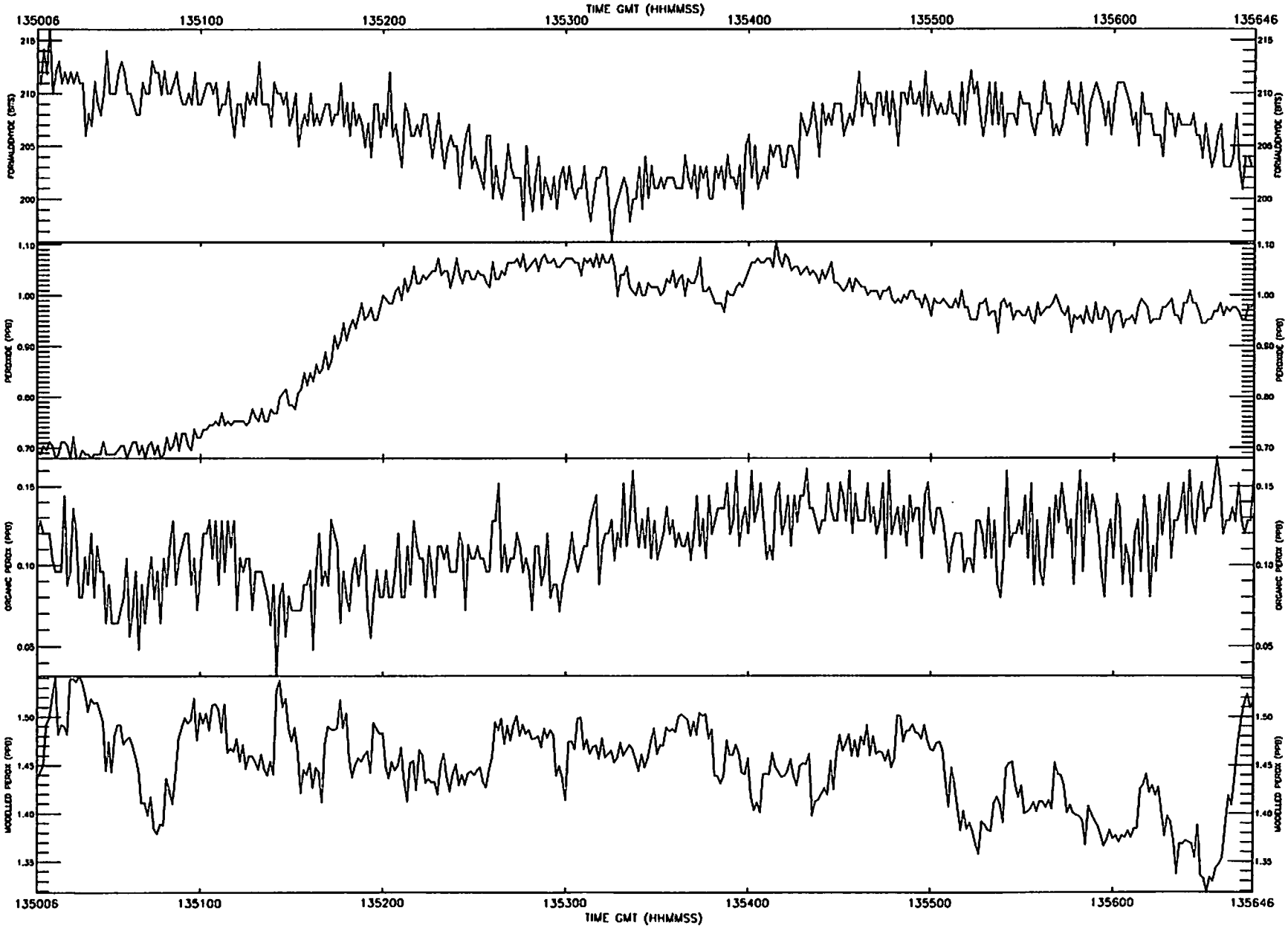
A533 05-APR-97 R10 FL150 From 135006-135646 *Plotted 19-Jun-1997 09:07*



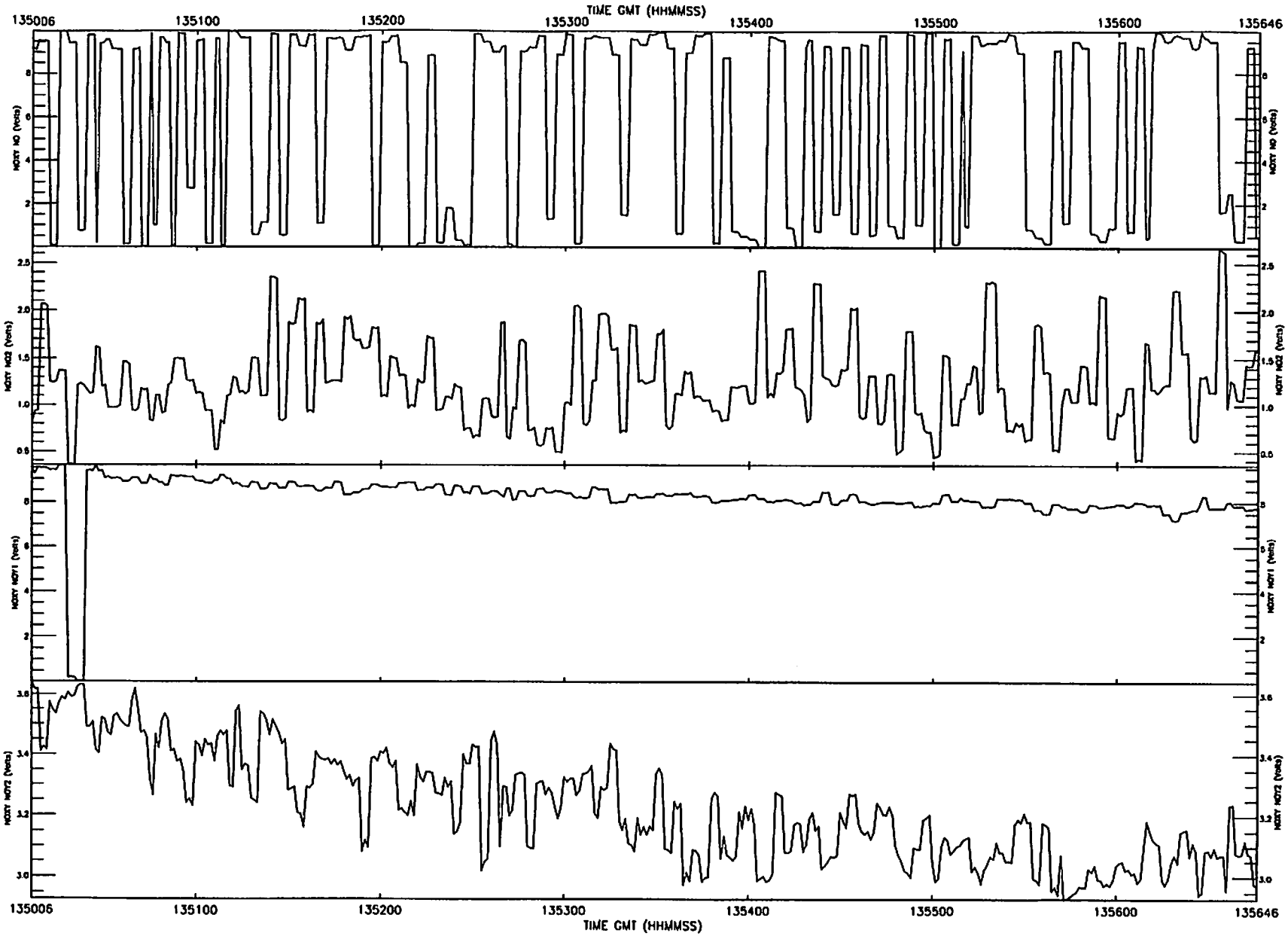
A533 05-APR-97 R10 FL150 From 135006-135646 *Plotted 19-Jun-1997 09:07*



A533 05-APR-97 R10 FL150 From 135006-135646 *Plotted 6-Jun-1997 17:05*



A533 05-APR-97 R10 FL150 From 135006-135646 *Plotted 6-Jun-1997 17:05*



A533 05-APR-97 R10 FL150 From 135006-135646 *Plotted 6-Jun-1997 17:05*

STATIC PRESSURE (MB)
No of obs 401
Mean 572.557
Standard dev 0.633263
Max value 573.892
Min value 571.017

DEICED TRUE TEMP (DEG K)
No of obs 401
Mean 260.688
Standard dev 0.115036
Max value 260.945
Min value 260.471

DEW POINT (DEG K)
No of obs 401
Mean 256.209
Standard dev 0.343592
Max value 256.869
Min value 255.394

OZONE MIXING RATIO (PPB)
No of obs 401
Mean 50.0294
Standard dev 0.939291
Max value 52.3580
Min value 47.6808

JNO2 TOTAL (E-3/S)
No of obs 401
Mean 19.3511
Standard dev 10.4623
Max value 52.3119
Min value 15.3616

PEROXIDE (PPB)
No of obs 401
Mean 0.940309
Standard dev 0.124116
Max value 1.10400
Min value 0.680000

PRESSURE HEIGHT (METRES)
No of obs 401
Mean 4562.18
Standard dev 8.36975
Max value 4582.54
Min value 4544.54

CORRECTED LATITUDE (DEGREES)
No of obs 401
Mean 39.4344
Standard dev 9.737230e-02
Max value 39.6022
Min value 39.2666

CORRECTED LONGITUDE (DEGREES)
No of obs 401
Mean -23.6592
Standard dev 9.350554e-02
Max value -23.4936
Min value -23.8186

NORTHWARD WIND COMPT (M S-1)
No of obs 401
Mean 1.17810
Standard dev 0.504182
Max value 2.09000
Min value -0.113708

EASTWARD WIND COMPT (M S-1)
No of obs 401
Mean -3.86939
Standard dev 0.687722
Max value -2.55850
Min value -5.41476

VERTICAL WIND COMPT (M S-1)
No of obs 401
Mean 0.716103
Standard dev 0.971526
Max value 2.65372
Min value -0.572060

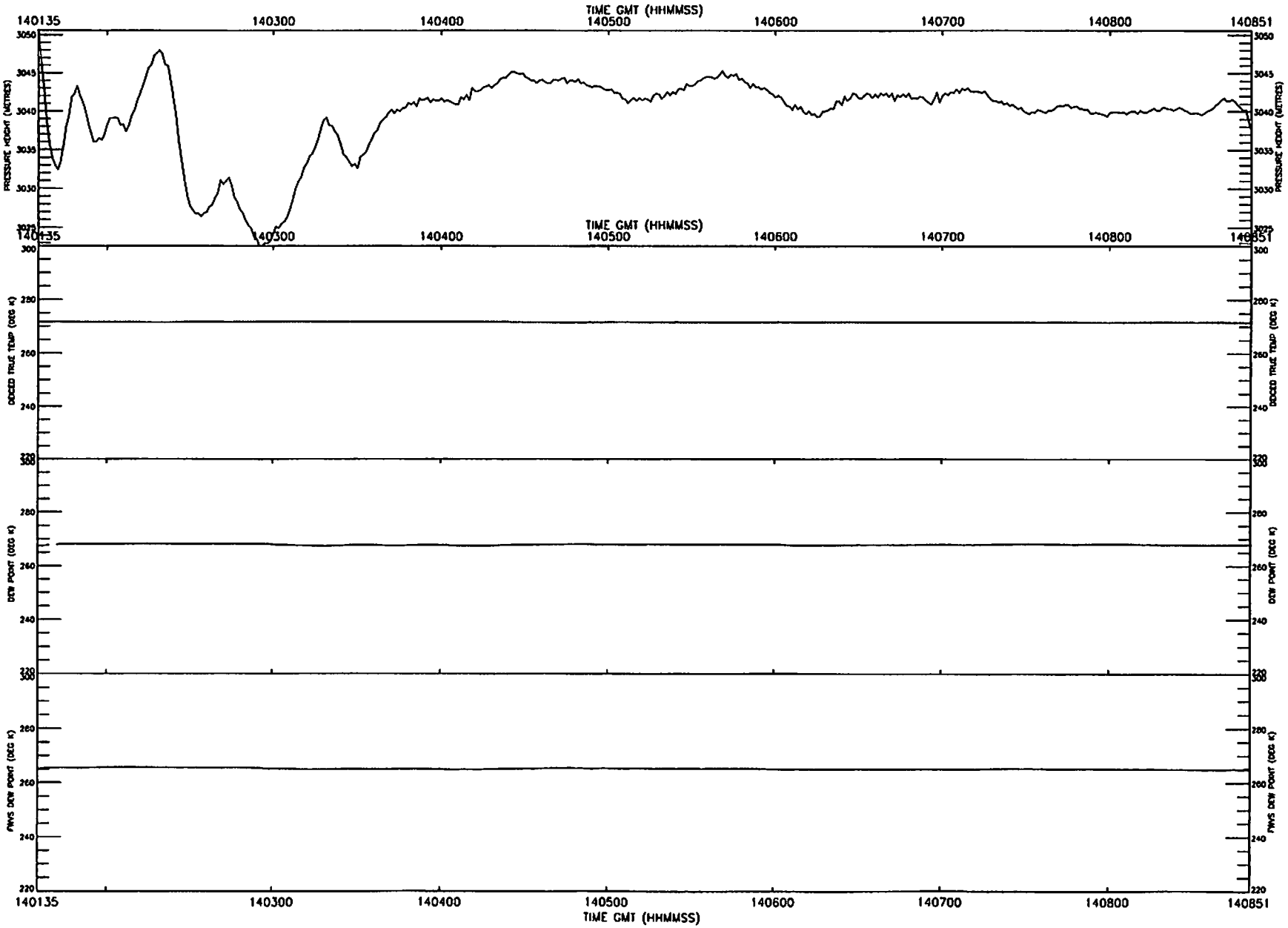
WIND SPEED (MS-1)
No of obs 401
Mean 4.09518
Standard dev 0.561911
Max value 5.42727
Min value 2.86638

WIND DIRECTION (DEG)
Mean 106.934

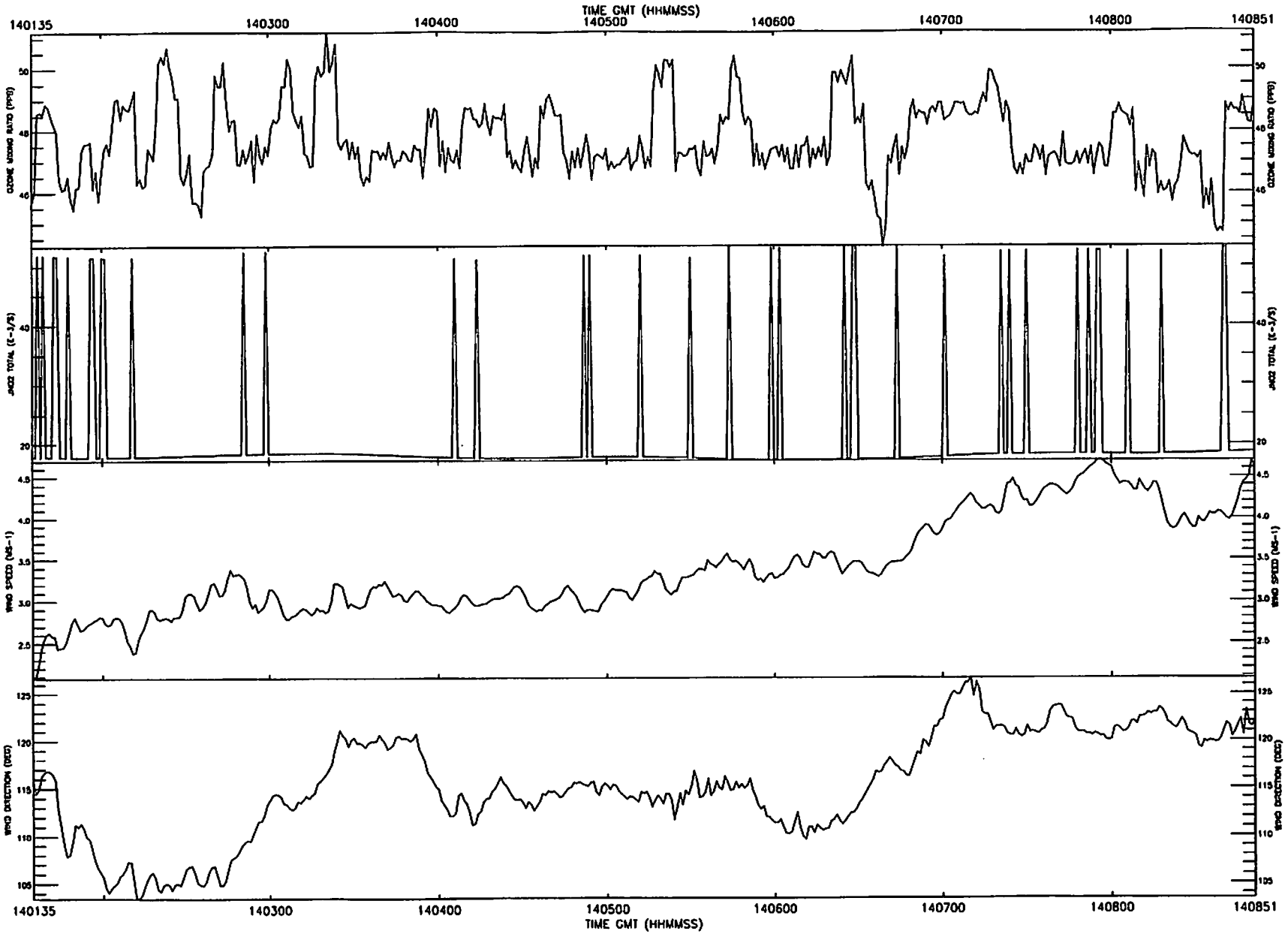
TRUE AIR SPEED (M S-1)
No of obs 401
Mean 115.007
Standard dev 1.37772
Max value 119.655
Min value 112.426

HEADING (DEG)
Mean 216.904

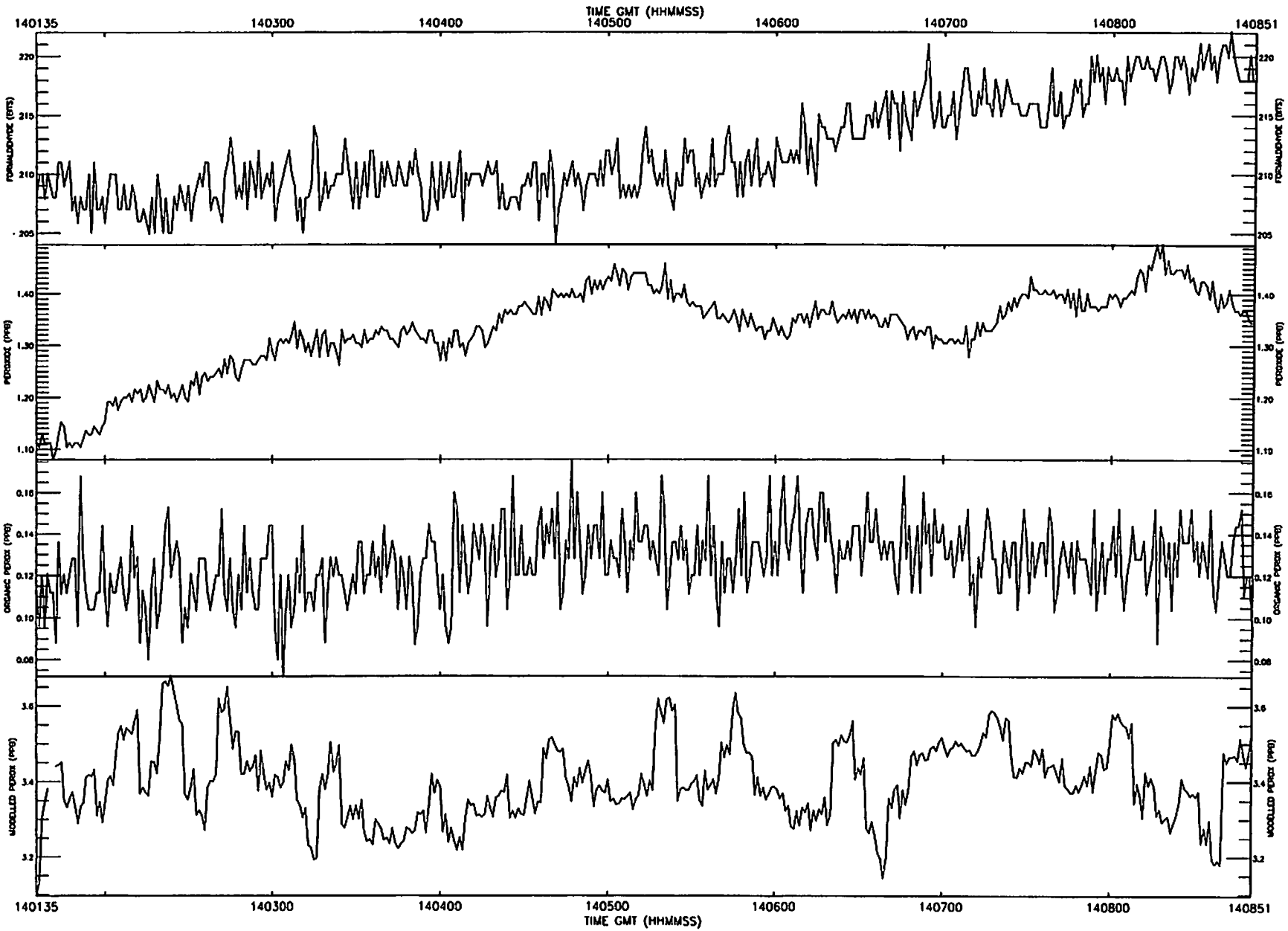
A533 05-APR-97 R11 FL100 From 140135-140851 *Plotted 19-Jun-1997 09:08*



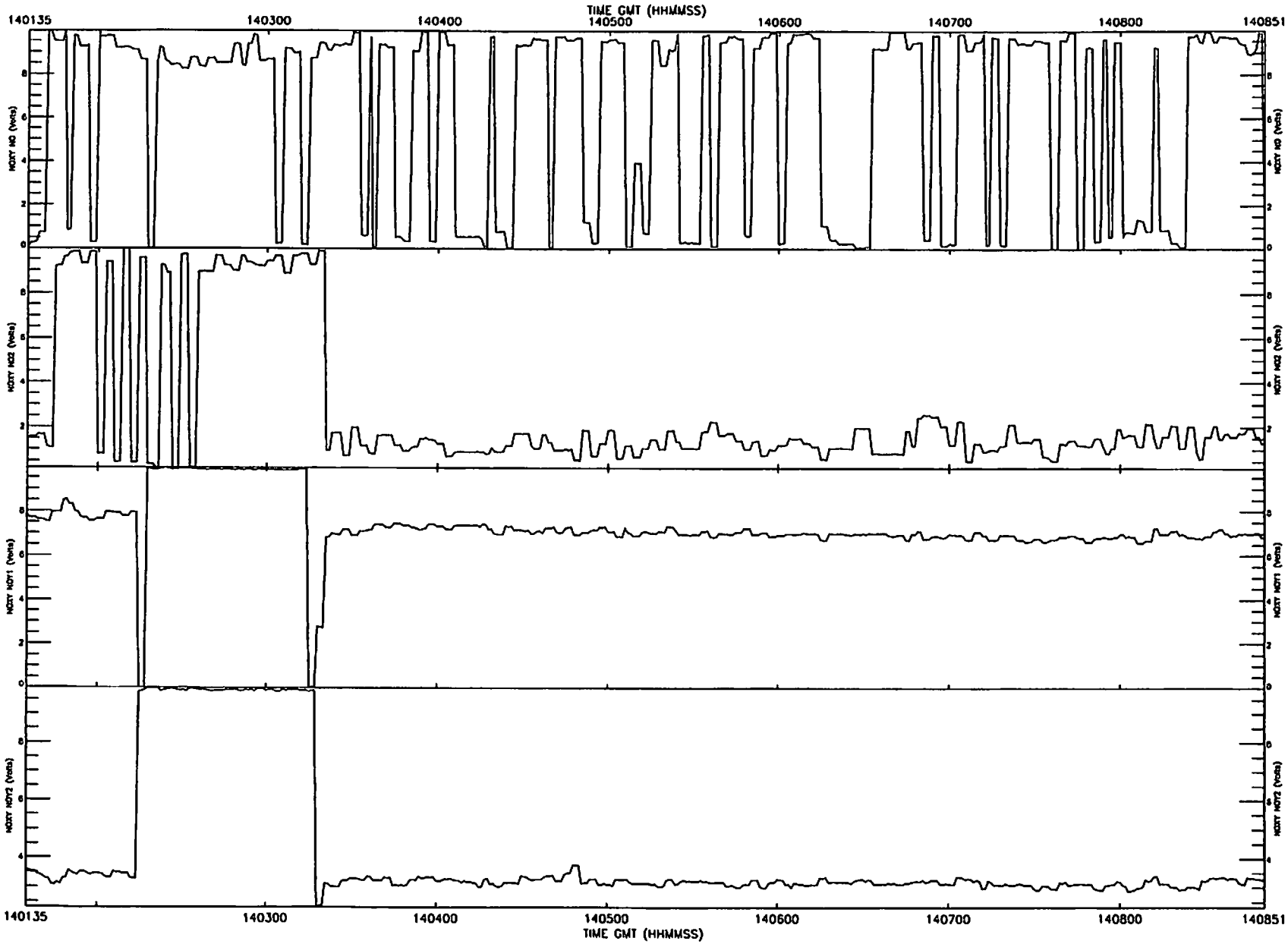
A533 05-APR-97 R11 FL100 From 140135-140851 *Plotted 19-Jun-1997 09:08*



A533 05-APR-97 R11 FL100 From 140135-140851 *Plotted 6-Jun-1997 17:06*



A533 05-APR-97 R11 FL100 From 140135-140851 *Plotted 6-Jun-1997 17:06*



A533 05-APR-97 R11 FL100 From 140135-140851 *Plotted 6-Jun-1997 17:06*

STATIC PRESSURE (MB)
No of obs 437
Mean 697.545
Standard dev 0.441022
Max value 699.063
Min value 696.586

DEICED TRUE TEMP (DEG K)
No of obs 437
Mean 271.713
Standard dev 6.829476e-02
Max value 271.891
Min value 271.580

DEW POINT (DEG K)
No of obs 437
Mean 268.002
Standard dev 0.214470
Max value 268.354
Min value 267.479

OZONE MIXING RATIO (PPB)
No of obs 437
Mean 47.6915
Standard dev 1.19394
Max value 51.1883
Min value 44.2589

JNO2 TOTAL (E-3/S)
No of obs 437
Mean 20.2797
Standard dev 9.36895
Max value 52.1198
Min value 16.7211

PEROXIDE (PPB)
No of obs 437
Mean 1.33000
Standard dev 8.163451e-02
Max value 1.49600
Min value 1.08000

PRESSURE HEIGHT (METRES)
No of obs 437
Mean 3039.74
Standard dev 4.96504
Max value 3050.55
Min value 3022.66

CORRECTED LATITUDE (DEGREES)
No of obs 437
Mean 38.8767
Standard dev 9.397245e-02
Max value 39.0386
Min value 38.7129

CORRECTED LONGITUDE (DEGREES)
No of obs 437
Mean -24.2341
Standard dev 0.102081
Max value -24.0576
Min value -24.4055

NORTHWARD WIND COMPT (M S-1)
No of obs 437
Mean 1.48490
Standard dev 0.510290
Max value 2.56222
Min value 0.561409

EASTWARD WIND COMPT (M S-1)
No of obs 437
Mean -3.03286
Standard dev 0.421684
Max value -1.87206
Min value -4.04827

VERTICAL WIND COMPT (M S-1)
No of obs 437
Mean 0.928916
Standard dev 0.806282
Max value 2.52090
Min value -7.353210e-02

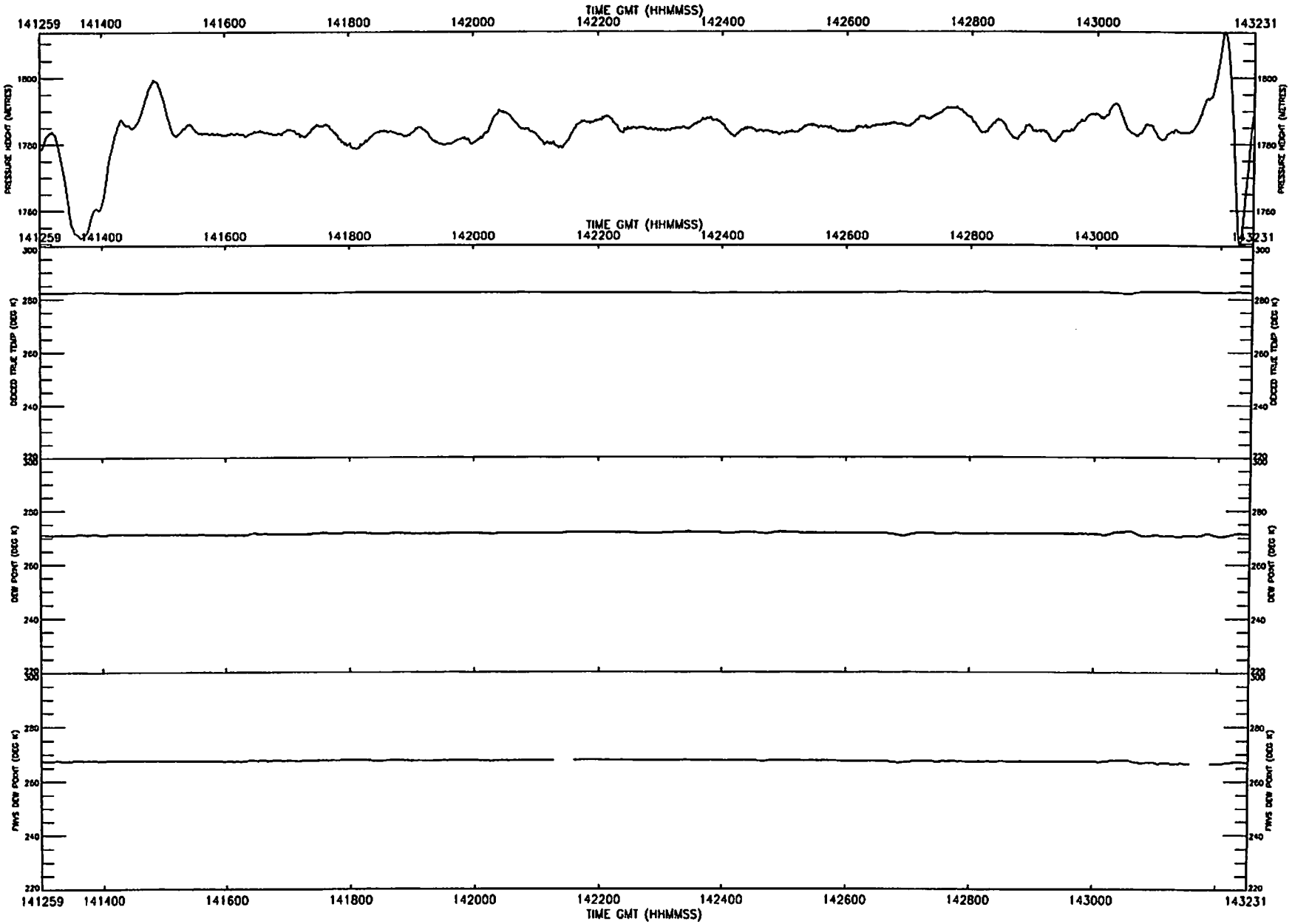
WIND SPEED (MS-1)
No of obs 437
Mean 3.39173
Standard dev 0.580760
Max value 4.69400
Min value 2.07470

WIND DIRECTION (DEG)
Mean 116.087

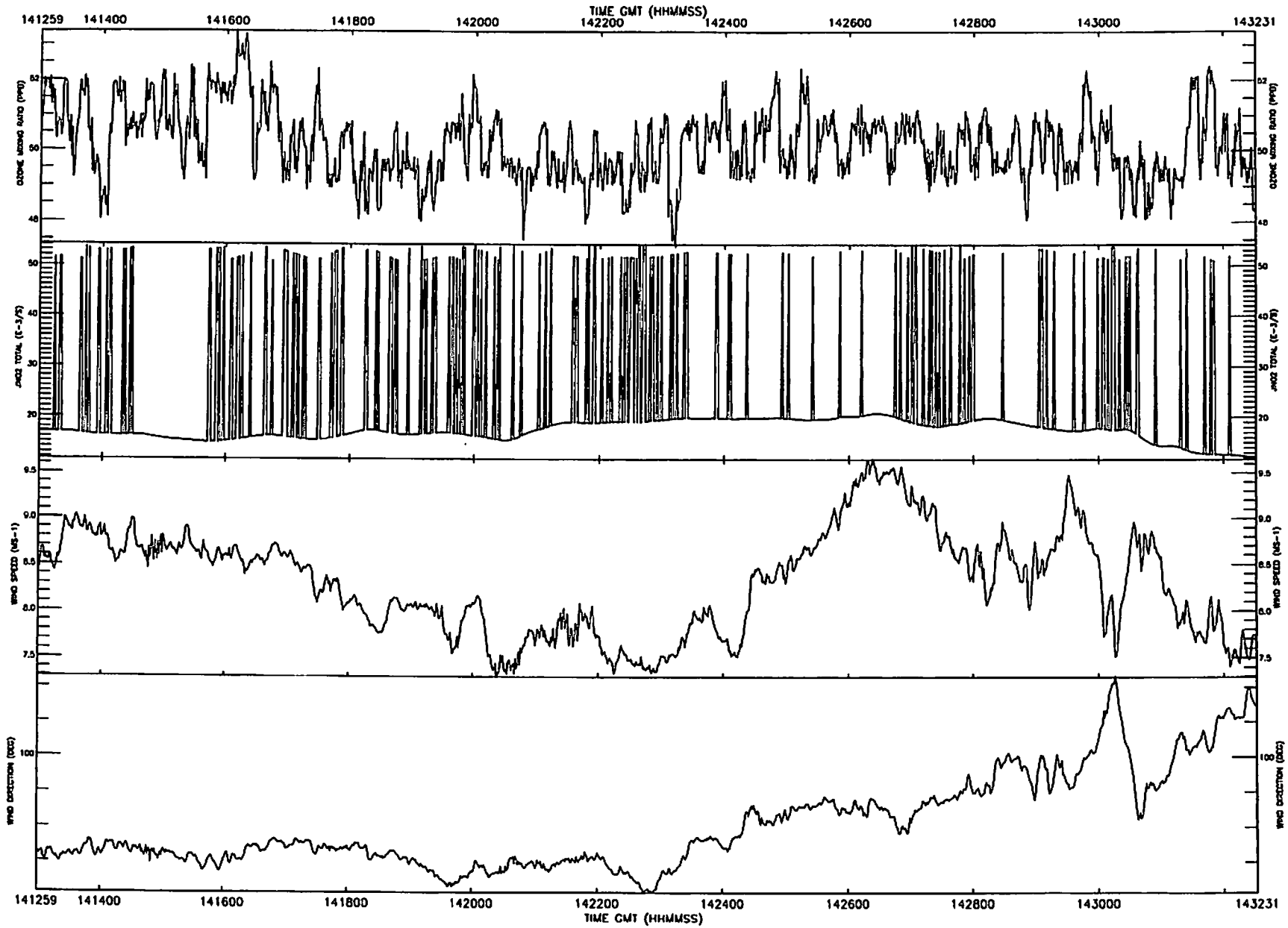
TRUE AIR SPEED (M S-1)
No of obs 437
Mean 107.130
Standard dev 0.904814
Max value 109.653
Min value 105.699

HEADING (DEG)
Mean 219.844

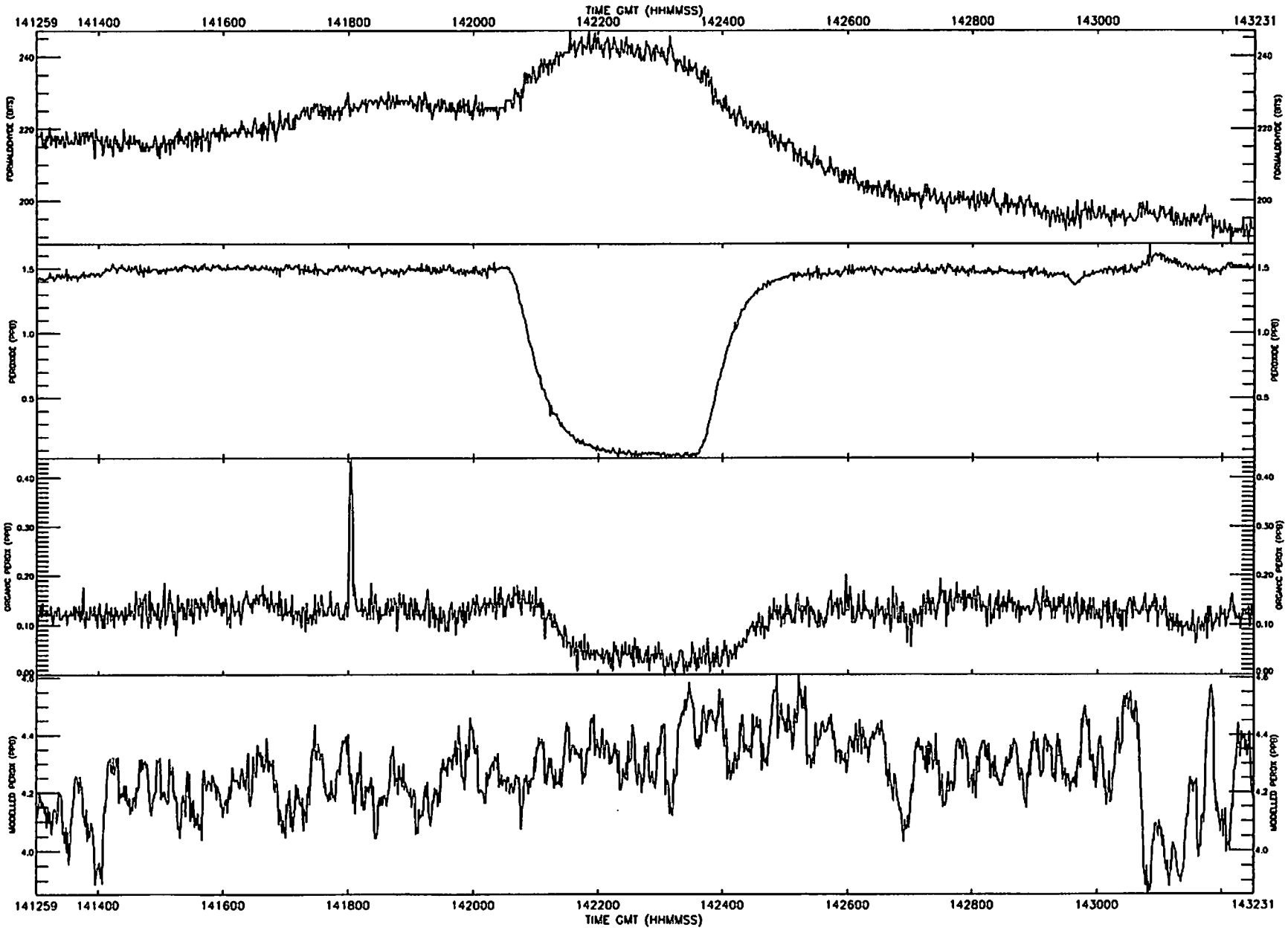
A533 05-APR-97 R12 6000' From 141259-143231 *Plotted 19-Jun-1997 09:10*



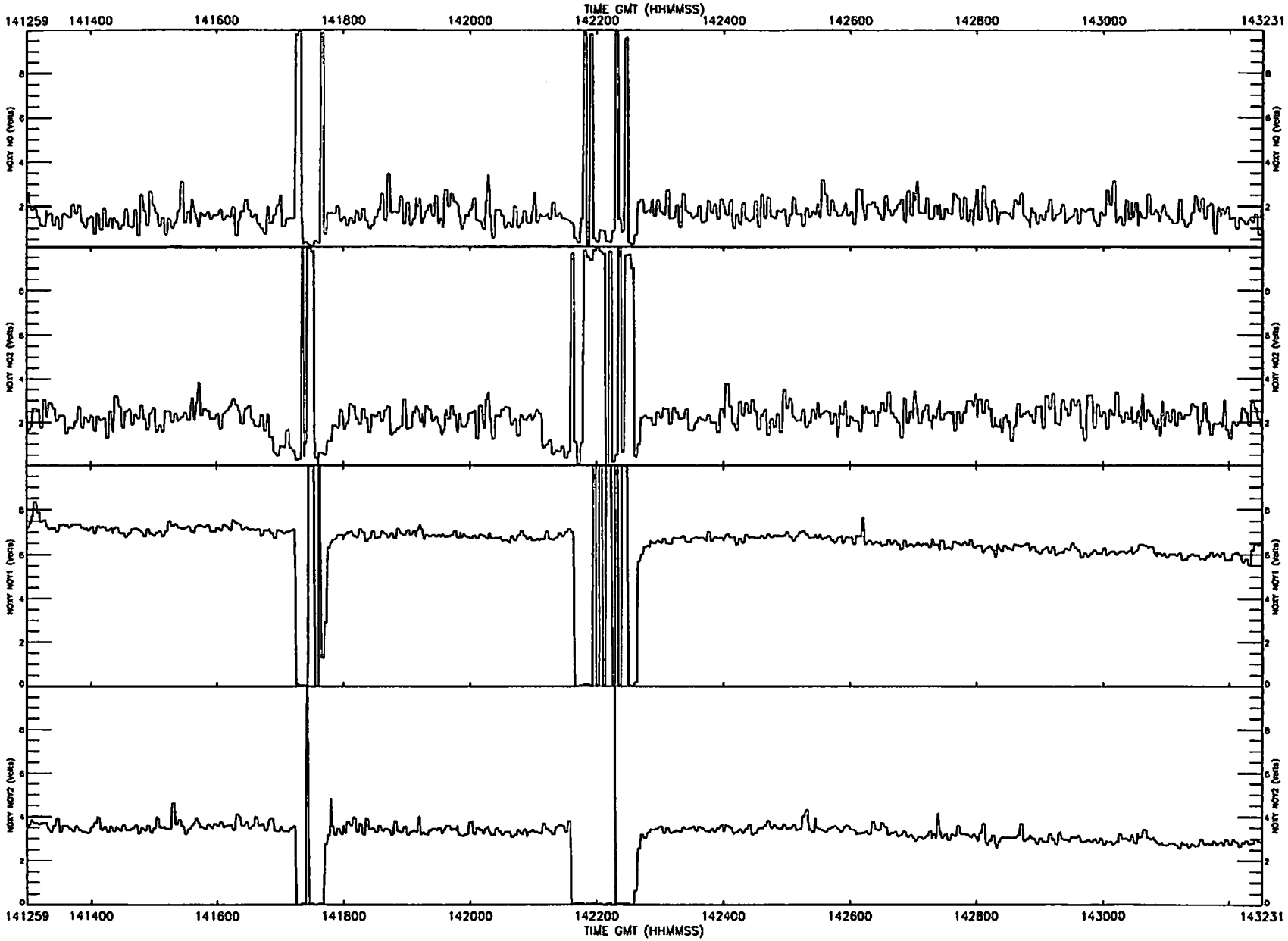
A533 05-APR-97 R12 6000' From 141259-143231 *Plotted 19-Jun-1997 09:10*



A533 05-APR-97 R12 6000' From 141259-143231 *Plotted 6-Jun-1997 17:09*



A533 05-APR-97 R12 6000' From 141259-143231 *Plotted 6-Jun-1997 17:09*



A533 05-APR-97 R12 6000' From 141259-143231 *Plotted 6-Jun-1997 17:09*

STATIC PRESSURE (MB)
No of obs 1173
Mean 816.533
Standard dev 0.718121
Max value 819.999
Min value 813.558

DEICED TRUE TEMP (DEG K)
No of obs 1173
Mean 282.270
Standard dev 0.186310
Max value 282.824
Min value 281.874

DEW POINT (DEG K)
No of obs 1173
Mean 271.351
Standard dev 0.326683
Max value 272.164
Min value 270.324

OZONE MIXING RATIO (PPB)
No of obs 1173
Mean 50.1677
Standard dev 1.00961
Max value 53.3890
Min value 47.3646

JNO2 TOTAL (E-3/S)
No of obs 1173
Mean 22.9146
Standard dev 12.8760
Max value 54.4498
Min value 11.7058

PEROXIDE (PPB)
No of obs 1173
Mean 1.26373
Standard dev 0.473448
Max value 1.68800
Min value 3.999999e-02

PRESSURE HEIGHT (METRES)
No of obs 1173
Mean 1783.69
Standard dev 7.11492
Max value 1813.22
Min value 1749.39

CORRECTED LATITUDE (DEGREES)
No of obs 1173
Mean 38.1079
Standard dev 0.234417
Max value 38.5215
Min value 37.7157

CORRECTED LONGITUDE (DEGREES)
No of obs 1173
Mean -25.0798
Standard dev 0.288240
Max value -24.5886
Min value -25.5775

NORTHWARD WIND COMPT (M S-1)
No of obs 1173
Mean 5.243809e-02
Standard dev 0.931075
Max value 2.85435
Min value -1.19938

EASTWARD WIND COMPT (M S-1)
No of obs 1173
Mean -8.26158
Standard dev 0.583200
Max value -6.99300
Min value -9.63699

VERTICAL WIND COMPT (M S-1)
No of obs 1173
Mean 0.600879
Standard dev 0.523554
Max value 2.64445
Min value -0.287956

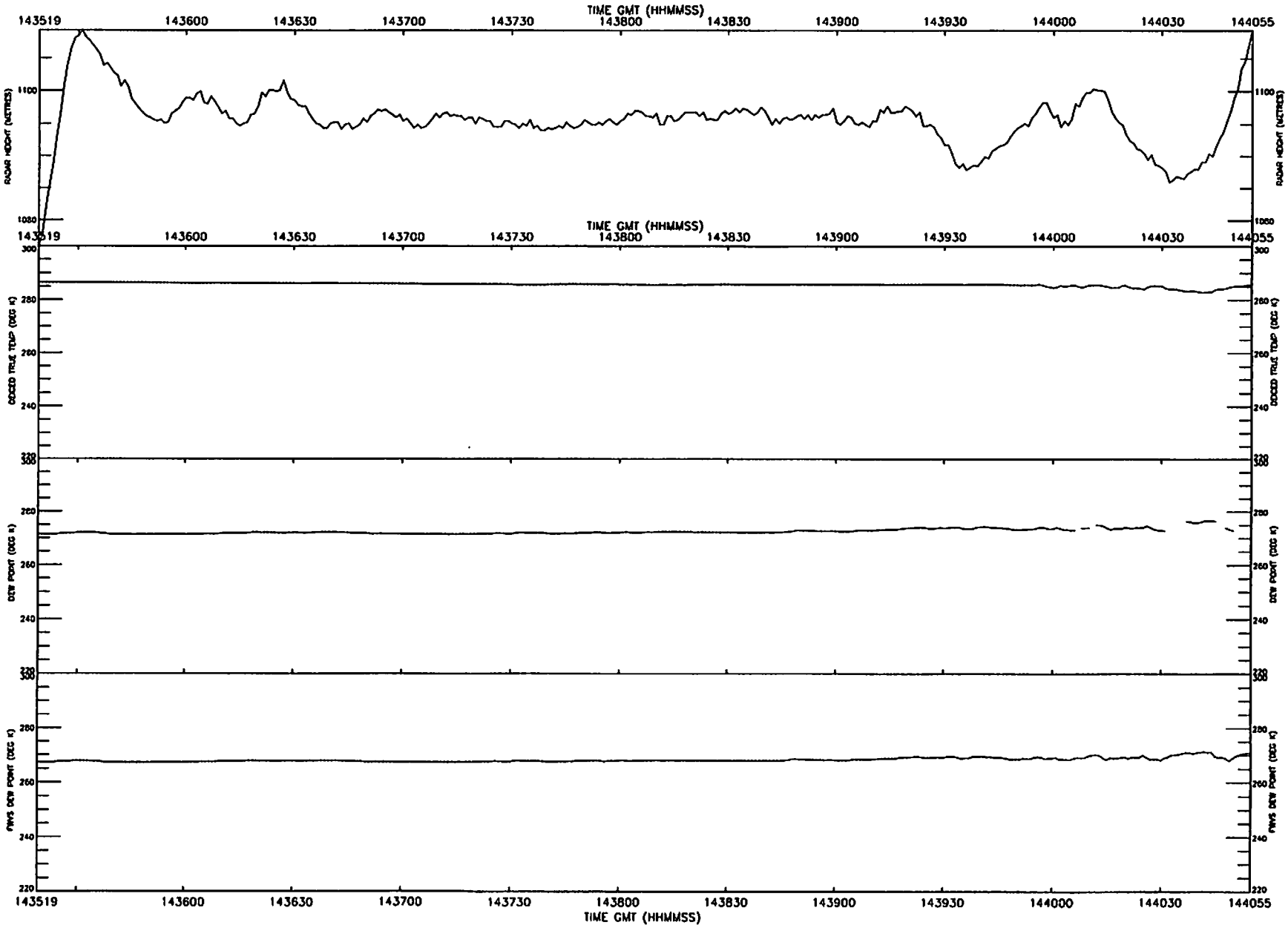
WIND SPEED (MS-1)
No of obs 1173
Mean 8.31603
Standard dev 0.553352
Max value 9.64954
Min value 7.29106

WIND DIRECTION (DEG)
Mean 90.3637

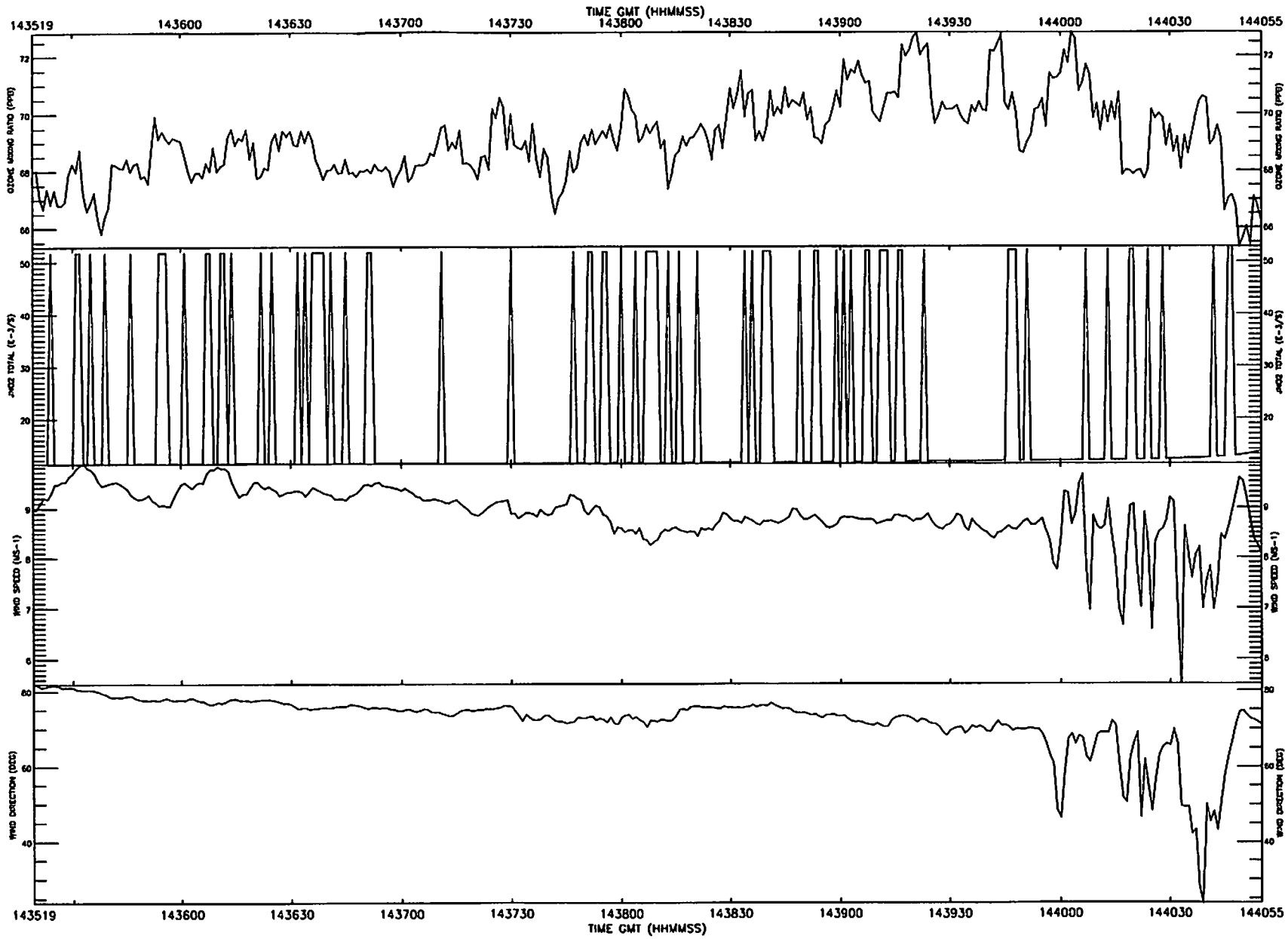
TRUE AIR SPEED (M S-1)
No of obs 1173
Mean 101.380
Standard dev 1.40838
Max value 105.147
Min value 97.5793

HEADING (DEG)
Mean 223.981

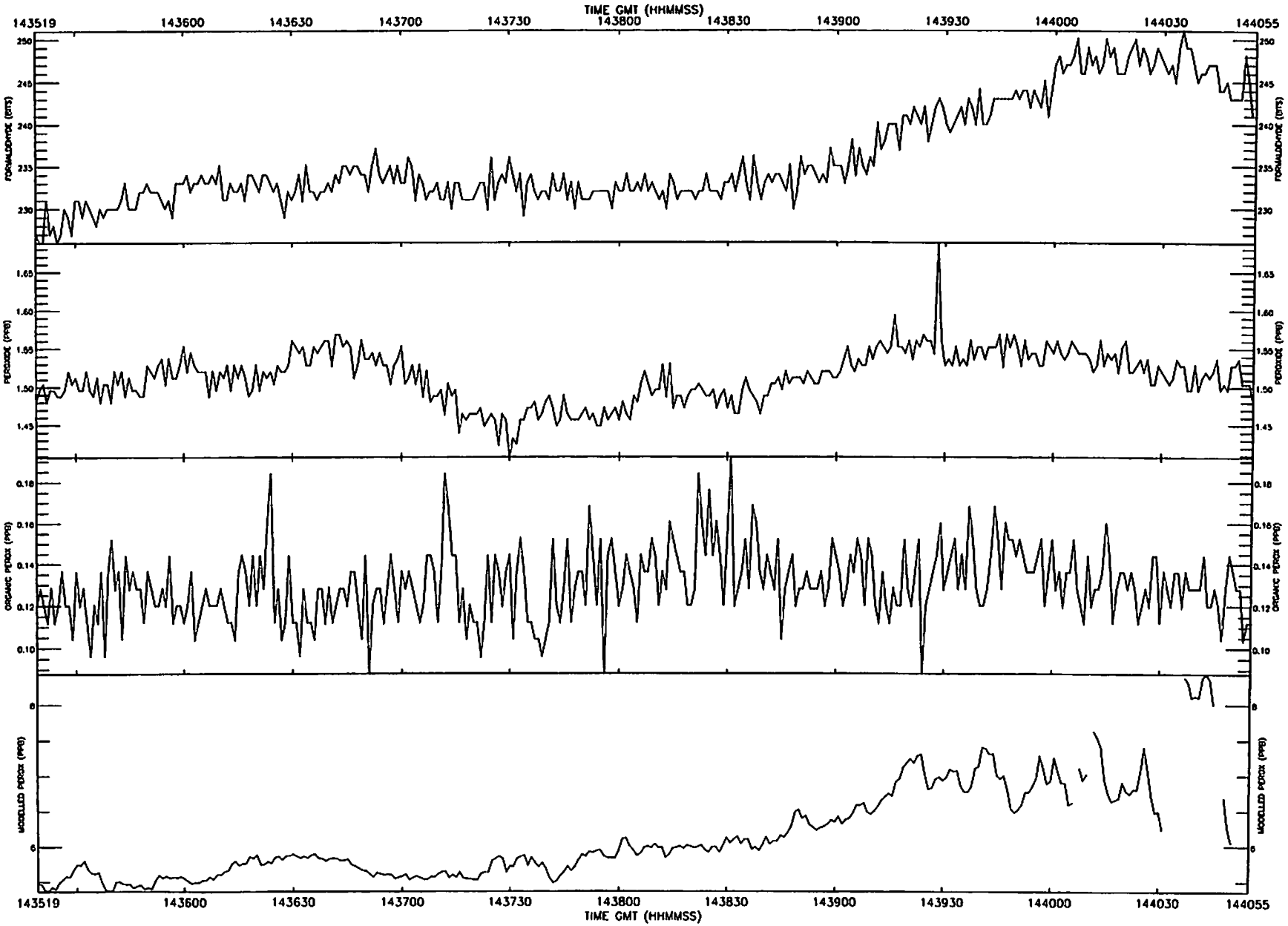
A533 05-APR-97 R13 3500' From 143519-144055 *Plotted 19-Jun-1997 09:11*



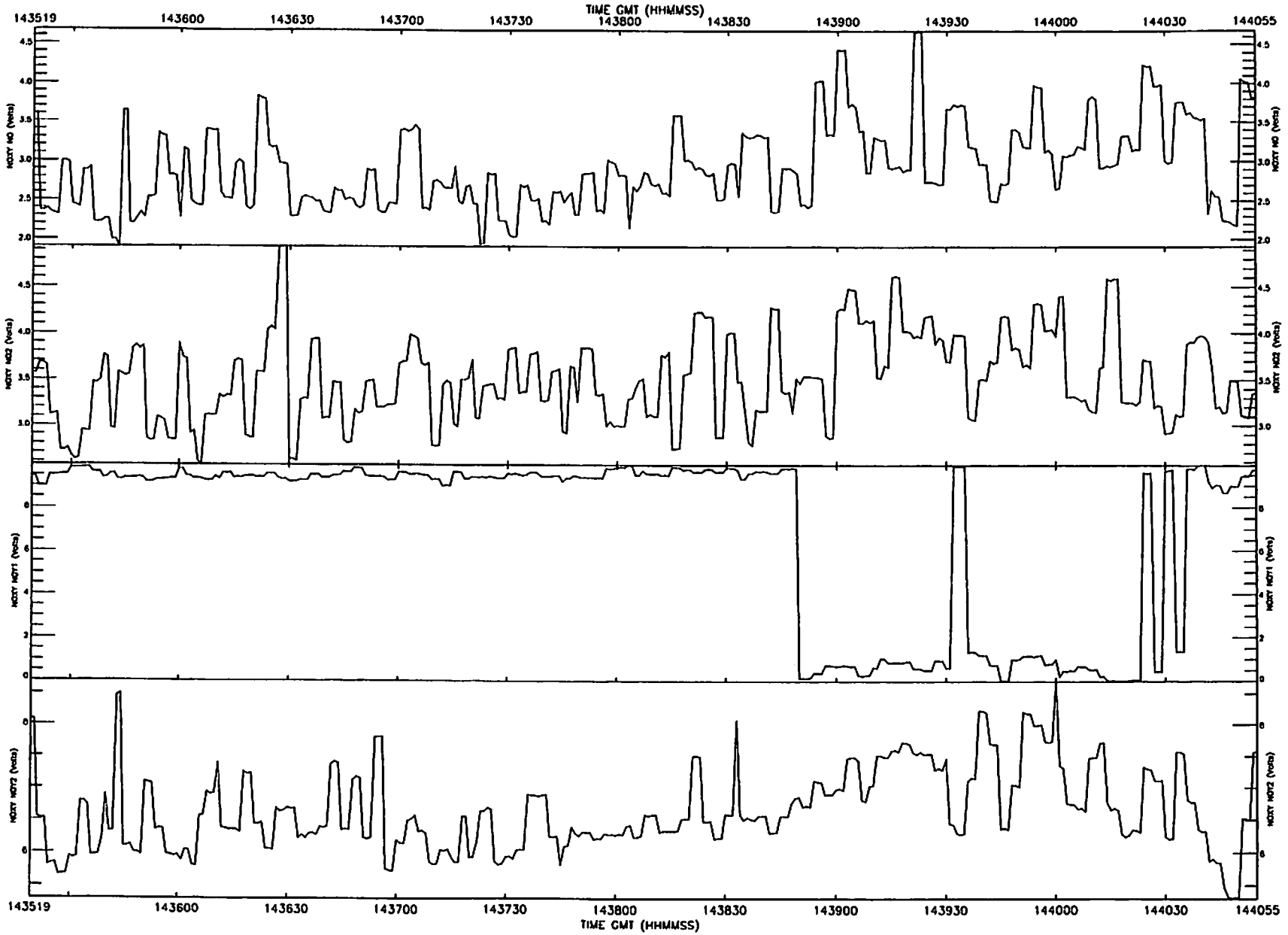
A533 05-APR-97 R13 3500' From 143519-144055 *Plotted 19-Jun-1997 09:11*



A533 05-APR-97 R13 3500' From 143519-144055 *Plotted 6-Jun-1997 17:10*



A533 05-APR-97 R13 3500' From 143519-144055 *Plotted 6-Jun-1997 17:10*



A533 05-APR-97 R13 3500' From 143519-144055 *Plotted 6-Jun-1997 17:10*

STATIC PRESSURE (MB)
No of obs 337
Mean 893.594
Standard dev 0.426083
Max value 895.595
Min value 892.192

DEICED TRUE TEMP (DEG K)
No of obs 337
Mean 285.750
Standard dev 0.627250
Max value 286.585
Min value 282.993

DEW POINT (DEG K)
No of obs 337
Mean 272.558
Standard dev 1.19674
Max value 276.646
Min value 271.240

OZONE MIXING RATIO (PPB)
No of obs 337
Mean 69.1414
Standard dev 1.41925
Max value 72.8405
Min value 65.3471

JNO2 TOTAL (E-3/S)
No of obs 337
Mean 20.6947
Standard dev 16.9695
Max value 53.2552
Min value 11.3002

PEROXIDE (PPB)
No of obs 337
Mean 1.51240
Standard dev 3.348388e-02
Max value 1.68800
Min value 1.40800

RADAR HEIGHT (METRES)
No of obs 337
Mean 1095.70
Standard dev 4.14866
Max value 1109.18
Min value 1075.92

CORRECTED LATITUDE (DEGREES)
No of obs 337
Mean 37.4210
Standard dev 8.644789e-02
Max value 37.5697
Min value 37.2714

CORRECTED LONGITUDE (DEGREES)
No of obs 337
Mean -25.5220
Standard dev 9.614103e-03
Max value -25.5053
Min value -25.5391

NORTHWARD WIND COMPT (M S-1)
No of obs 337
Mean -2.64451
Standard dev 0.849605
Max value -1.26584
Min value -7.23473

EASTWARD WIND COMPT (M S-1)
No of obs 337
Mean -8.40238
Standard dev 0.939100
Max value -2.83354
Min value -9.72157

VERTICAL WIND COMPT (M S-1)
No of obs 337
Mean 0.873203
Standard dev 0.633829
Max value 2.03085
Min value -1.97231

WIND SPEED (MS-1)
No of obs 337
Mean 8.88181
Standard dev 0.553799
Max value 9.85980
Min value 5.51236

WIND DIRECTION (DEG)
Mean 72.5294

TRUE AIR SPEED (M S-1)
No of obs 337
Mean 97.2508
Standard dev 1.57914
Max value 100.766
Min value 91.4709

HEADING (DEG)
Mean 174.842

Instrument Log Sheet: Permit

Flight No: 533 Date: 5/4/97 Page: 1 / ____

Campaign: ACSOS/ARCTAS TRANSIT Operator(s): BJB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
			Zero	Mode A = 620 B = 620.
06-58			Cal	Hum 1.77 Hum B 1.21 30 Range
				DES 1) 240 ⇨ A & B
				1) 245 A & B
				1.4 L/min
				Permeation Run @ 40 setting
07:35				Flow Change
07:53:30			ZeroOn	Liquid Introduced
08:13	4000'		ZeroOn	Out of Plateau
08:14	4000'	Run 1	Zero off	
8:16:40				Response to Zero off. Noise
				⇨ 160 sec lag H_2O_2
				190 sec lag Org
08:19:12		End Run 1		
	↑			Climb ≈ 6000'
08:23:29	8500'	Run 2		
08:24:16			ZeroOn	Climbing to get out of cloud
08:25:03		End 2		
08:27			ZeroOff	Zero A & B .04
08364	16000'	START Run 3		
0834			ZeroOn	
0842			ZeroOff	
0846	16000'			1.4 L/min ambient flow
085854	16000'	End R3		Radial descent to 180'
	↓	St P		
090825		St P1		from 16000 @ 1000'/min
091531	8500'			500'/min Descent
0922	4500'	↓		

Instrument Log Sheet: H2O

Flight No: 533 Date: 5/4/07 Page: 2 / ____

Campaign: ~~ACSOE~~ / AZORA TRANSIT Operator(s): RSB

Time (GMT)	Altitude	Run	Zero /Cal	Comments
0926	2000'	EP1	M	1.4 L/min Air Flow
0928	1000'	SP4		
09		EP4+		In Cloud
0937	↑	SP2.1		Climb @ 500'/min
093717	5000'			
094644	5000'	SP5		
095151		EP5		
	10000↑	SP2.2		Climb @ 1000'/min
				In & out Cloud.
9:56:20				Near cloud Tops
95649		End P2.2		
↑	16000	SP6.1		
095700		Zero On		Zeroing on Hexane/H2O/Ice
100000		Zero Off		
100351		EP6.1		
	→	SP6.2		Data Run.
101013		EP6.2		
101013		SP2.3	to 15000'	1000'/min
10512		EP2.3		
10512	15000'	SP7		
102012		EP7		
	↑	SP2.4		Ascent up to 20000' &
				Transit to Alamos @ Warp
				Speed.
10:21 40	16500			1.35 Flow Rate
	17500			1.28
	19000			1.2
102626	20000'	EP2.4		-15°C Wind 275°
1032	20000		Zero On	@ 66 kts
1035	20000		End Zero	

Instrument Log Sheet: H_2O_2

Flight No: 533 Date: 5/4/97 Page: 3 /

Campaign: ACCESS / BOREAS TRANSIT Operator(s): SR

Time (GMT)	Altitude	Run	Zero /Cal	Comments
122500	20000'		Zero On	A=3.04 Volts.
122900	20000'		Zero off	1.15 L/min Flow
(Set pmts and Ran Anderson Vogt / K. Law				Contouring Correlations 1.1 H_2O_2 mon / H_2O_2 medium Ran Zero 10:35 – 12:20 Also regular correlation with O_3 & Water Vapor
130120			Zero On	Zero my constants
130420			Zero off	
				Went open system Telescope and finish spoiling airplane
132441	20000'	Skip		
134624	20000	ER9		
134524	↓	SP3.1		Rolling starts to 50'
135006	15000'	EP3.1		
135006		SR10		Flow 1.4 L/min
135646	15000'	ER10		
135646	↓	SP3.2		(1.2 ppb H_2O_2 @ 15000')
140135		EP3.2		
140135	10000'	SR11		180 knots indicated Speed
140850	10000'	ER11		
140850	↓	SP3.3		Flow Rate 1 4 L/min
141255		EP3.3		
141255	6000'	SR12		
		ER12	I	
141420			Zero On	B 0.04 A 0.03
142120			Zero off	
143231	6000'	ER12		
143231	↓	SP3.4		Descending to 3500'
1435		EP3.4		

Instrument Log Sheet: _____

Flight No: 535 Date: 5/4/17 Page: 4 / ____

Campaign: ~~ARCTAS~~ ARCTAS-CARB Operator(s): [illegible]

Time (GMT)	Altitude	Run	Zero /Cal	Comments
14:35:19	3500'	SR13		
14:40:56	3500'	ER13		
14:40:56	↓	SP35		@ 50'
14:47:17	50'	EP35		
14:48:22	100'	SR14		
14:58:05	100'	ER14		@ 100'
14:56:50			Zero In	
			Cals	
				London to Santa Monica

Glossary

Aircraft [illegible]ion, Speed and Attitude

- **Navigation:** The aircraft carries GPS, OMEGA, and inertial navigation systems.
- **Pressure height:** is based on the standard atmosphere as specified by the International Civil Aviation Organisation (sea level pressure of 1013.25 hPa). Pressure height is quoted in terms of Flight Levels (height in hundreds of feet *e.g.* FL100 = 10000 feet).
- **Radar height:** altitude of the aircraft above surface, measured by radar.
- **Time:** All times are UTC.

General meteorology

- **Tephigrams:** are given for every major profile of each flight. A tephigram is a thermodynamic diagram (temperature (T) - entropy (ϕ) diagram) used to assess the static stability of a given atmospheric profile. Other meteorological organisations use similar diagrams such as the Emagram or the Skew T log p diagram.
- **Deiced true temperature:** air temperature with corrections for aircraft speed and altitude.
- **Potential temperature:** the temperature that a parcel of air would have if it follows a dry adiabatic lapse rate to the 1000 hPa level.
- **Dew point:** dew point (the temperature at which a sample of air would just become saturated with respect to a plane surface of water if cooled at a constant pressure) calculated from the chilled mirror General Eastern hygrometer.
- **FWVS Dew point:** dew point calculated by use of the Lyman-α spectroscopic instrument "the fluorescence water vapour sensor".

Cloud Physics

- **PCASP:** The Passive Cavity Aerosol Sampling Probe counts number concentrations (number per cm^3) of particles in 15 channels spaced pseudo-logarithmically over the diameter range 0.10 μm to 3.00 μm, to provide a particle size distribution over this range.
- **FSSP:** The Forward Scattering Spectrometer Probe is used to measure water droplets in the size range 0.5 to 47.0 μm diameter (cloud droplets). It has four range settings, each of which is divided into 15 size channels.

Chemistry Parameters

- **Ozone:** Calibrated readings from the TECO 49 ozone analyser in ppb. Instrument scientist: Joss Kent (UK Met. Office).

- **JNO_2:** The sum of upward and downward facing radiometers (raw data). Instrument scientists: Christoph Gerbig and Sandra Schmitgen (FZ Jülich).

- **Hydrogen peroxide:** Raw data recorded in ppb (approx.). Instrument scientist: Brian Bandy (UEA Norwich).

- **Organic peroxide:** Raw data recorded in ppb (approx.). Instrument scientist: Brian Bandy (UEA Norwich).

- **Modelled peroxide:** hydrogen peroxide concentrations as estimated from the concentrations of ozone and water vapour concentrations according to the following algorithm. The model is used in flight and is included in this data summary for individual scientists assessment of the use of algorithms for the purpose of in flight planning. Contact Brian Bandy, Claire Reeves (UEA, Norwich) or Dave Tiddeman (UK Met. Office) for details.

$$H_2O_2 = (k_3 j_4 [O_3][H_2O])/(k_5[M](j_6+k_7+[OH]k_8)$$

where k_3 is the rate coefficient for the reaction: $O(^1D) + H_2O \rightarrow 2OH$
k_5 is the rate coefficient for the reaction: $O(^1D) + M \rightarrow O(^3P) + M$
k_8 is the rate coefficient for the reaction: $OH + H_2O_2 \rightarrow H_2O + HO_2$
k_7 is the first order loss due to dry deposition. However, as the boundary layer is difficult to define, this term has been ignored for the time being.
j_4 is the rate coefficient for the reaction: $O_3 + h\nu \rightarrow O(^1D) + O_2$
j_6 is the rate coefficient for reaction: $H_2O_2 + h\nu \rightarrow OH + OH$
j_4, j_6 and [OH], calculated by a 2D model, are dependent upon latitude and time of year.

- **Formaldehyde:** Raw data recorded as bits. NB this instrument has a long time delay *ca.* 12 minutes. Instrument scientist: Graham Mills (UEA, Norwich).

- **NOxy:** Parameters (NO, NO_2, NO_{y1}, NO_{y2}) were recorded on MRF's data recording system and are plotted in volts. Instrument scientist: Stephane Bauguitte (UEA, Norwich).

- **Bottles:** Please refer to the bottle flight logs (within the flight folder section to see when these were filled). Bottle filler: David Tiddeman (UK Met. Office).

- **Bags/CO analysis:** Please refer to the bottle flight logs (within the flight folder section to see when these were filled). Bottle filler: David Tiddeman (UK Met. Office). Analysis was carried out at ITE Edinburgh by Neil Cape. Plots of CO (ppb) with altitude (pressure height in metres)are included. Contamination has been noted in some of the bag samples, for further advice contact ITE Edinburgh.

Natural Environment Research Council

ARASF

For more information contact:

Met. Research Flight
Y46 Building, D.E.R.A.
Farnborough, Hants GU14 6TD

Fax: +44 (0) 1252-376588

Dr. Andrew Kaye
NERC Scientific Liaison
Tel: +44 (0) 1252-395843
E-mail: A.Kaye@nss.nerc.ac.uk

Dr. Hannah Richer
Tel: +44 (0) 1252-395830
E-mail: hricher@meto.gov.uk

Mr. Illyea Hawke
Tel: +44 (0) 1252-395840
E-mail: idhawke@meto.gov.uk

METEOROLOGICAL OFFICE